RAILROAD GAZETTE

FRIDAY, JUNE 8.

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Contributions.

Ventilation.

JUNE 3, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am pleased to see from your editorial of last week that there is one at least amongst the number of railroad commissioners who asks why the matter of ventilation is not entailed on that of car heating. It is a crying disgrace to the intelligence of car builders that they have not, and will not do anything that is sensible towards the relief of the suffering thousands pent up in close, heated cars throughout the land. At one time I was led to think that a more stubborn, bull-headed class of men did not exist than railroad mechanics, and on my first introduction as sanitary engineer to a New England railroad official of long standing, when happening to question the present methods of car ventilation, he very emphatically told me "if I was not by introduction a friend of his, he would show me to the door with a shotgun." He then proceeded to explain how much men in his position were pestered by "cranks" on this and like matters. This led to a degree of sympathy with railroad officials which has not been lessened by closer associations with them and knowledge of the difficulties they have to encounter in dealing with owners of new devices. The flood of wretched contrivances offered has brought it about that you might as well shake a red rag at a bull as say the word ventilation to a car builder.

We should very naturally kick with emphasis if any one required us to wash in the filthy water used already by another, but we contentedly breathe over and over again the air which has passed through lungs and over bodies foul and diseased, within and without. Thus we strain at a gnat and swallow a camel. I ask the public, you the editor, and you the constructors of cars, to consider this matter in the sanitary sense, and to simply arrange for rendering innoxious the poisoned atmosphere of our cars.

I know it to be a hard job to educate the public and a good many railroad officers to stand fresh air if they know they are getting it. You will have to smuggle it into the cars. Witness the expression of astonishment that overspread the genial face of Mr. Adams, of the Boston & Albany, at a late New England Railroad Club meeting, on learning that one of the greatest roads in the country had tried Pennycuick's system of ventilation in a very crude form by cutting fresh air openings in the floor under each seat. He called for a repetition of the remark, and being satisfied that he had heard aright, he asked, "Did you not kill the passengers or blow them all out of the car?" Although these 3 in. by 4 in. openings were only screened by wire gauze the car was peculiarly comfortable.

I attach a cutting from your own editorial of Oct. 28, 1887, for the benefit of the commissioner and as stating the principle:

If air is distributed and directed so as to strike on the steam pipe in small jets and become warmed before being admitted into the car, no disagreeable effect or cold draft will be felt, and the benefit of fresh air at a comfortable temperature will be obtained. Unfortunately, few inventors seem to recognize that heating and ventilation should go hand in hand, but it is to be hoped the present opportunity for a material improvement in the ventilation of railroad cars will be properly utilized and such a serious source of discomfort, ill health and death as foul air will be swept away by the current of fresh air which the improved system of heating renders possible.

Many systems of ventilation depend wholly or in great part upon the movement of the train, and are thus defective in principle and unequal in action, giving a strong draft when the wind is blowing hard or the train running fast, and becoming inoperative and permitting stagnation when the car is standing still. Any constant supply of heat will, however, produce a constant upward current of air, and as the heat from steam pipes can be tolerably equally distributed throughout a car, it follows that steam heating renders possible a constant and equal circulation of air throughout the car, and that it is practically possible to make the ventilation independent of the speed of the train and tolerably equal in all parts of the car. SANITAS.

Locomotive Side Rods.

ST. LOUIS, May 28, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of the 25th inst., Mr. John C. Trautwine, jr., in commenting on a previous communication of mine on "Locomotive Side Rods," asks if the *f* in my formula is not really the *modulus of rupture* instead of the *fibre strain*."

In replying to this query I would say that I consider these two expressions as synonomous *within the elastic limit*. The values given, 12,500 and 16,300 lbs. per sq. in., are far within the elastic limit of either iron or steel, and that therefore, in this case, the *f* used in the formula is both the modulus of rupture and the strain on the extreme fibres of the bar.

This raises at once the old question whether or not the ordinary formulæ for cross-bending are to be considered as really giving the facts of the accompanying phenomena, or are they to be considered as simply convenient expressions, based on untenable hypotheses. The latter view is quite generally held, but I think it is erroneous. The error comes from finding the formulæ to fail on *breaking tests*. Now there is nothing in the hypothesis that would lead one to *expect* the formula to hold *beyond the elastic limit*. It all depends on this: *Does a plane cross-section remain a plane after the beam is bent?* So far as experiments go, I think they all show that a section plane before bending remains a plane after bending *until the elastic limit stress is reached in the extreme fibres*. Then the plane becomes a curve, and the law of a uniformly varying stress no longer holds. Until some experimenter shall show that this is not the case, it is not wise to assert that the ordinary formulæ for cross-bending are not rigidly correct within the elastic limits.

Furthermore, it is evidently bad designing to allow a known fibre strain of 16,000 lbs. to recur in an important part of a locomotive, and to repeat itself indefinitely in opposite directions, when a breakage would be so disastrous, and the danger could be avoided so easily as it can be in the case of a locomotive side rod. The rod described in my communication of Sept. 16, 1887, was one which I happened to find in the round-house of the Missouri Pacific, in this city, where I went expressly to measure a few for purposes of illustrating the subject. It was on a passenger locomotive of that road, and evidently was designed for passenger service. If it was not designed to run at as high a speed as 70 miles an hour, then it *should* have been so designed, for I think any passenger engine is liable to attain that speed at the foot of a grade on every trip it makes. If not at the foot of a grade then when it spins its wheels, which is just as bad for the side bar, but not so dangerous to the passengers perhaps. I have no reason to think the Baldwin locomotive company is alone in making dangerous side rods; but whether it is or not, no love for a "home establishment" should cause one to "rejoice to swear by it" when it is shown to be in error. J. B. JOHNSON.

Interlocked Switches and Signals.

BY CHARLES R. JOHNSON, C. E.

III.

In giving a general sketch of interlocking as it stands in this country, it will not be out of place to enumerate some of the more prominent devices that are used to accomplish the end and aim of interlocking signaling, which is to actuate switches and signals in a perfectly safe way in the most rapid and economical manner. A great many people fail to realize that the subject must be treated as a whole to attain good results, and not in parts. Many inventors have labored industriously to perfect an interlocking machine, or a signal, or a compensator, or a particular kind of blade, thinking that when that was accomplished, they would hold the key to signaling. In signaling, too, as in other matters, people go to work inventing before ascertaining what has already been accomplished.

The interlocking machine naturally comes first in order, because it is the basis on which all other parts depend. In speaking of machines in this connection it will be understood that *lever* machines are referred to and not *capstan wheel* machines, which are quite new and not thoroughly perfected. It will be a surprise to a great many railroad men to learn how many different kinds of machines have been manufactured and used. The most prominent are the Stevens & Sons, the Saxby & Farmer, the Webb (confined to the London & Northwestern Railway of England), the Imray (used only on the Midland Railway of England), the McKenzie, Clunes & Holland, and the Ransome & Rapier. Machines have also been invented and manufactured by Messrs l'Anson, Kitchen, Easterbrook, Buck, Baines, Baker, Hannaford, Cochrane and Smith, but scarcely any are now in use. The Johnson was invented in 1885 and is not yet very extensively known or used, but is standard on the Manhattan and the New York, New Haven & Hartford, and used on several other roads.

The Stevens machine was the first in the field, and for simplicity and durability the locking has never been equaled, and in the latest machine (the Johnson), this principle of locking is retained, but applied differently. A sufficiently clear description of this machine is given on page 84 of the current volume of the *Railroad Gazette*, as used on the Long Island Railroad. The Stevens machine has been extensively used on all the large railroads of England and Scotland. The objections to the machine are that the locking is not preliminary, and is not easily accessible for alterations or additions.

The Saxby & Farmer machine is probably the most used and most widely known, having been fixed in large numbers in almost all quarters of the globe. The writer has erected this machine in Great Britain, Ireland, France, India and America. A description and illustrations of this machine will be found in the *Railroad Gazette* for 1878. The objections to it are that the parts wear considerably, and it is difficult to apply complex locking, and a portion of it (the lower bars) is always difficult of access.

THE WEBB MACHINE.

The Webb machine, designed for and used only on the London & Northwestern of England, has "lever locking" as distinguished from "catch rod locking." The locking machine is of the horizontal and vertical bar type, but much more carefully constructed than usual. The horizontal bars are of Bessemer steel, rolled to a shallow channel; the locking studs are squared to fit the channel and are then secured. The vertical notched bars are also of steel, the notches being punched out cold. Each vertical bar is guided by a channel the length of itself, and one wall of this channel is made deeper than the other and notches are cast in it to act as guide for the horizontal bars, the notches being faced by a special drifting machine at the rate of thirty-five notches per hour. The motion of the lever is communicated to the vertical notched bars by a double, hook-shaped lever, centered on the lever which hooks over a projection cast on the lever quadrant casting. Upon the lever being moved $\frac{3}{4}$ inch, the hook lever is tilted up, communicating sufficient motion to the locking bars to effect all necessary locking, and it is further tilted when the lever is within $\frac{3}{16}$ inch of its pulled over position, communicating additional motion to the locking bar to effect the necessary unlocking.

Owing to the position of the centre upon which the hook lever turns, any strain put on a rock lever is taken principally by the main framing, and the locking, which is of a light design, is thus saved from undue strain. If the apparatus be large and the locking bars numerous, the vertical notched bars are divided in the middle by a short compensating lever, and being thus counterweighted, any length of bar can be used. A machine in course of construction for Rugby has bars 18 ft. deep. A detail highly appreciated by the operators working the machines is the loop handle (used also on the Johnson machine), which Mr. Webb has substituted for the spring catch handle usually provided.

Of the 26,500 levers on the London & Northwestern, about one half are of Mr. Webb's pattern. Their working has been everything that can be desired, and although many of the machines are at busy junctions, notably Crewe with 144 levers, and Spring Branch with 80 levers, in which latter tower 9,065 levers are pulled over and put back in twenty-four hours, the cost of maintenance has been trifling. The largest machine of Mr. Webb's pattern is that provided at Crewe, where six lines of railroad meet at a common junction north of the platforms. Previous to the erection of this machine the junction was controlled from two towers, and some doubt was raised as to the wisdom of concentrating so much work in one tower. A single tower containing 144 levers, was, however, provided, with the result that the junction has been worked more economically and with increased safety; misunderstandings likely to arise out of a joint control being avoided.

A machine in the course of construction for working the south junction at Rugby will contain 180 levers, 84 horizontal locking bars, each 83 ft. long, and 180 vertical bars, each 18 feet deep. The tower will be 96 ft. 6 in. long by 12 ft. wide and 23 ft. high.

The above description of Mr. Webb's machine is taken from the paper read by Mr. A. M. Thompson, Assoc. M. Institute C. E., London, before the Institute, on May 5, 1885.

Pneumatic Interlocking.

Compressed air has been applied to the movement of switches from interlocking apparatus in some ten or a dozen different plants, erected by the Union Switch & Signal Co. There are several towers in use at or near Oakland, Cal., and at least three in the vicinity of Pittsburgh, and still another is now erecting.

A cylinder is placed near each switch, and the movement of a piston in that cylinder is communicated by a rack and pinion gearing to the switch rails. If a facing-point lock is used, the connection is so arranged that in the first part of the piston stroke the bolt is withdrawn, in the middle of the stroke the rails are moved, and at the end of the stroke the bolt is shot again. It will be readily seen that this can be easily done with sufficient stroke and power. An air reservoir is placed near, and the admission of air from the reservoir, to one end or the other of the cylinder, is governed by a valve which is controlled by the operator in the tower. The connection from the tower to this valve is by small pipes filled with a non-freezing liquid. Compressed air, admitted to the top of the column of liquid in the tower, gives an impulse, which is transmitted at once to the valve, and causes air to be admitted to the switch cylinder.

The signals are actuated also by compressed air, by the method now used on the Fitchburg, and formerly used on the West Shore, for block signals. The same apparatus is used to move the block signals on the Pennsylvania for some nine miles out of Pittsburgh. Briefly, air is admitted from an auxiliary reservoir to a cylinder on the signal post by the movement of a valve which is electrically controlled. In the interlocked signals this valve is controlled from the tower machine; in block signaling it is controlled by a track circuit. The air is compressed for the yard tower in Pittsburgh by a small compressor near by. For the Wilkinsburg and East Liberty towers, 4½ and 7 miles out, and for the block signals in that vicinity, the compressor is at the Torrens' shops, five miles from Pittsburgh. It is intended to have the compressing for the whole Pittsburgh system done at Torrens. The working pressure for the switches and tower apparatus is about 60 lbs. per square inch.

The interlocking apparatus, through which motion is given both to switches and to signals, cannot be satisfactorily described without illustrations. It is enough to say here that it takes up far less space than mechanical interlocking, and that the labor of working it is very light. The interlocking can be made as effective as by any other apparatus, but

the multiplication of parts has been objected to as making it more liable to derangement. The ground connections can be buried out of the way, and can be led out from the tower in any way most convenient, and these must often be great and obvious advantages.

At the same time the relative economy of this system and of those which move the switches and signals by pipe and wire connections must depend on the special conditions of the place to be worked. In a large yard where many levers and much ground connection would be required, or in a situation where several towers can be supplied from one compressor, the pneumatic system might often be economical, and it can readily be imagined that the economy in operation might be very considerable. On the other hand, it would obviously not pay to put in a boiler and compressor for a small, isolated plant. The line at which one or the other system begins to be the more economical must be determined in each special case.

Shops of the Pond Machine Tool Co.

Messrs. Manning, Maxwell & Moore have sent us a blue print of the shops of the Pond Machine Tool Co. at Plainfield, N. J., on the line of the Central of New Jersey. The same drawing is reproduced in the current number of the *American Machinist*, and from the description given in that journal we make a few extracts.

The machine shop is 500 ft. long and 100 ft. wide, one story high, and abundantly lighted and ventilated from the roof, as well as by windows in the side walls, and heated by overhead system of steam pipes. Through the centre of the building runs a track connecting with the railroad, and while there the writer saw a locomotive come in and deliver a car load of stock beside the machine where it was wanted.

The space between this track and one of the rows of posts which support the roof and traveling cranes constitute the erecting floor, and is provided with a pit 100 ft. long, 10 ft. wide and 6½ ft. deep, walled up with brick, and having a cement floor. On the other side of the track, and between it and the other row of posts, the heaviest machine tools are placed.

Above the track, and the spaces each side of it, are two large traveling cranes, each of 15 tons capacity, made by the Morgan Engineering Co. Either of them can travel the entire length of the building, and they are both driven from a 3-in. square shaft, which is in one piece 500 ft. long, weighing 7¼ tons. It is turned round at the bearings, which touch the shaft on the under side only, and are automatically swung out of the way to allow the cranes to pass, and restored to their places afterwards. The two cranes command a floor space of 500 × 42 ft., within which all the heavy work is done. Outside of the two rows of posts, and between them and the outer walls, are the smaller machine tools, these spaces being provided with small traveling cranes worked by hand, that over the planers being simply a single rail, upon which travels a hand hoist.

Adjoining the machine shop is the engine room, in which is a Brown engine of 200 horse-power, and a dynamo for electric lighting (incandescent system), run by a double Armington & Sims engine of 100 horse-power. Under the engine room is a cellar in which are the steam pumps, one for returning the condensed steam from the heating pipes to the boilers, and the other for fire supply and general service. Electric signals are all over the building, communicating with the engine room, and when by this means the engineer receives the fire signal, he goes to this pump, puts an additional weight on the automatic valve which controls it, and the pressure is immediately increased to 100 lbs. At that pressure six streams can be thrown on to a fire in any part of the buildings.

In the south end of the machine shop, in the corner next the foundry, is the stock room, where all supplies are received. The railroad track runs by it, and at right angles to this track another one runs through the stock-room, and on through into the cleaning room of the foundry; the two tracks being connected by a turn-table in front of the stock-room. Inside the stock-room are track scales on which all castings coming from the foundry are weighed and checked off without being unloaded from the small car on which they are conveyed.

The cleaning room is in the north end of the foundry building, separated from the foundry by a low partition, which allows the large traveling crane to pass over it. This crane is similar to those in the machine shop, and travels the entire length of the foundry.

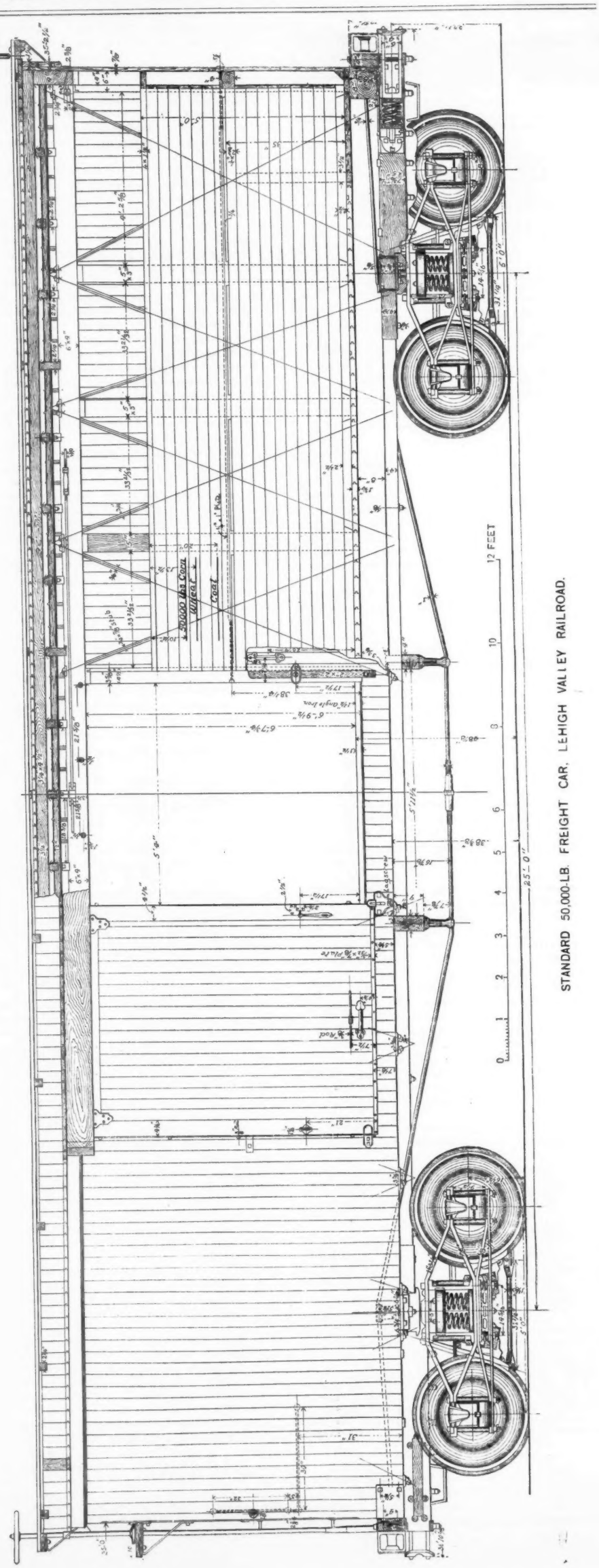
In the foundry is a core oven of improved construction. The bottom of the oven is level with the floor of the foundry, and a track runs into it, on which is a truck made entirely of iron. Large cores can be placed on this truck and run into the oven and baked without handling, after which they can be drawn out to a swinging crane, which stands near the oven, by which they can be delivered to the large traveling crane. The core oven is fired at the end opposite the doors, and the heat from the furnace passes through cast-iron flues of flat section, which pass back and forth through the oven at the sides. It is very efficient, a surprisingly small fire serving to keep it amply heated.

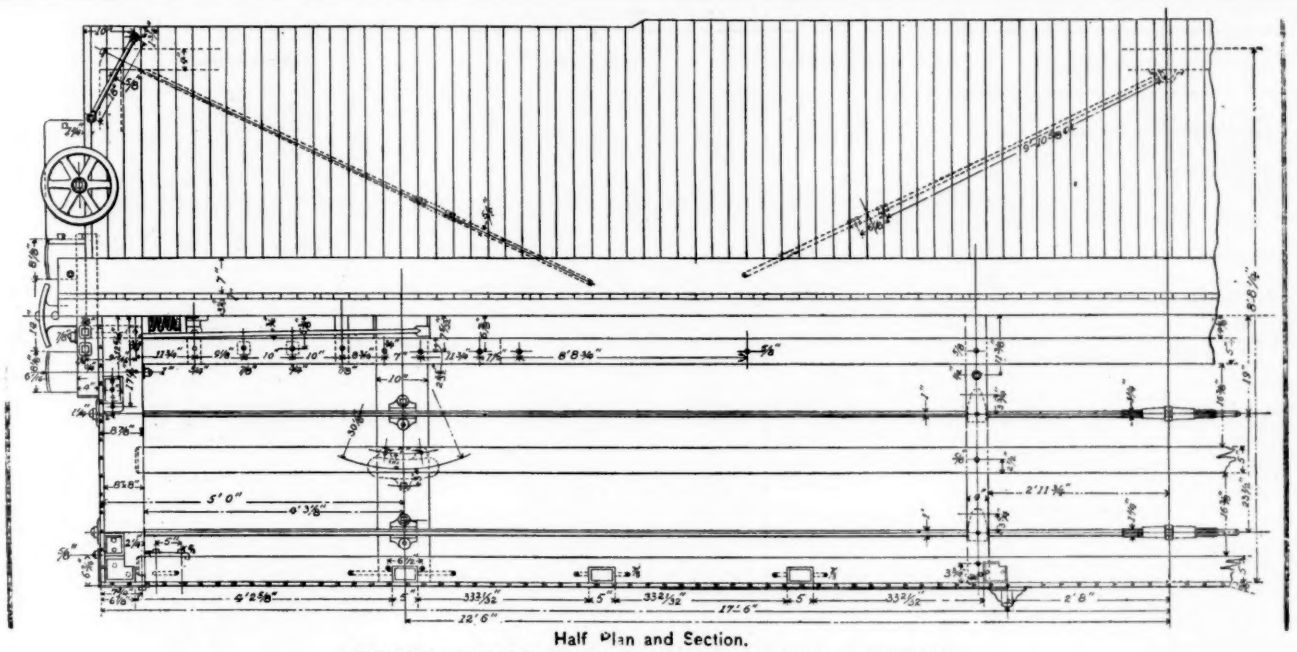
There are two cupolas capable of melting 8 and 15 tons of iron per hour respectively, blast being furnished by a large Root blower. Back of the cupolas is a large clear space, providing for free access, and in this space is a hydraulic lift, on the platform of which are rails which are a continuation of a track which runs out into the yard where the iron is kept.

The charging floor, 14 ft. above the molding floor, is 48 ft. square and composed entirely of iron plates. Iron is delivered by this floor in two ways. Pig iron is delivered by the railroad to the yard, from whence it is taken on a small car to the hydraulic lift before mentioned, and raised to the charging floor, where it is unloaded near the charging door. But if it comes in such shape as to be ready for the cupola, the cars in which it comes are pushed by a locomotive up the inclined track to a point over the sand storage vaults, and on a level with the charging floor, where it is unloaded ready for use. The fuel for the cupolas is also delivered at the same level to bins provided for the purpose.

Cars containing coal for steam making are pushed on over a trestle-work to a point over the boiler-house, and dumped through the roof in the same manner. Track scales at the foot of the trestle-work afford facilities for weighing all stock before it is unloaded.

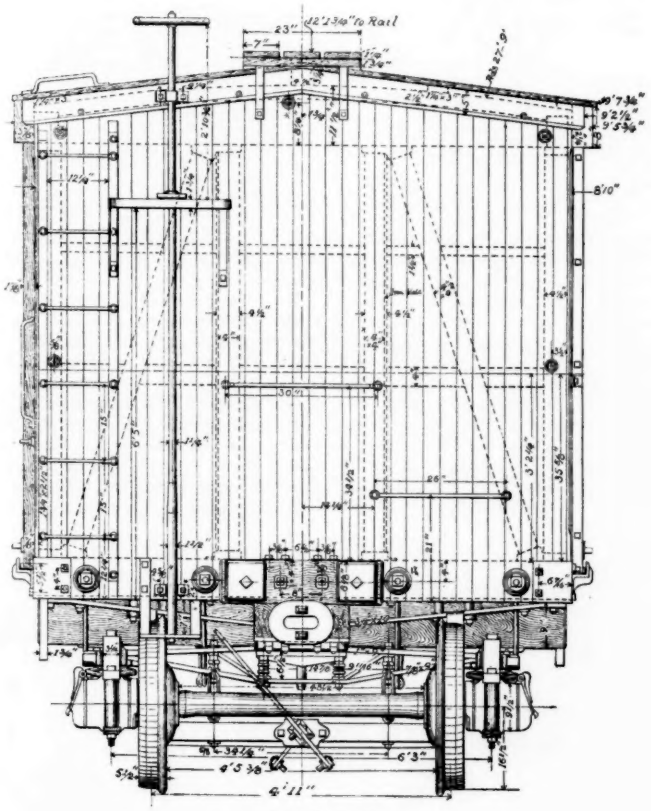
The blacksmith shop is entirely detached from the other buildings—the blast for the forges and the steam for the steam hammer being taken to it by pipes. It is 52 × 32 ft., and the walls, with the exception of door openings, are solid to a point about 6 ft. from the ground, above which they are almost entirely of glass, which is in frames so mounted that they can be swung out at the bottom, and in at the top, upon a pivot fixed at the centre. Iron forges are used, and a branch from the blast pipes is taken up into the flue above each forge and turned upward. The blast in the pipe can be regulated, or turned on or off at pleasure, and helps very





Half Plan and Section.

STANDARD 50,000-LB. FREIGHT CAR, LEHIGH VALLEY RAILROAD



End Elevation.

much in drawing out smoke and gas and in keeping things clean.

American Association of Railway Chemists.

At the annual meeting of the American Association of Railway Chemists, held in Cleveland recently, there was considerable discussion on lubricants.

Mr. Doscniell spoke of a case where the use of an oil intended for lubricating car journals during the summer had been continued into the cold weather and had caused an unusually large number of hot boxes. He said that when the oil was put into the boxes of freight cars with waste, instead of lubricating the journals it formed balls of frozen waste and oil. He favored the idea of a standard cold test and suggested that there might be devised a cold test apparatus the principle of which would be the measurement of the quantity of oil which would flow through an opening of a size similar to those found in ordinary oil cups.

Professor Denton, of Stevens Institute, Hoboken, N. J., favored grease for new brasses, but preferred oil for those which had been partly worn.

The subject of illuminating oils was discussed as concerns flashing and burning tests, instruments and the methods of making them. At a meeting of the association held in Buffalo, last May, the Elliott closed cup was adopted as the official instrument for determining the flash test of illuminating mineral oils. One of the members stated that while his tests with the open cup differed from 5 to 8 deg. from those of the manufacturers, the results were identical when both used the closed cup. For determining specific gravity it was decided to officially adopt the Westphal balance for accurate work, and the ordinary hydrometer for common work. It was recommended that each chemist provide himself with at least six hydrometers, each having a range of 10 deg.

Cold tests, burning tests in service, and photometric tests in service were briefly discussed. Mr. Brown, chemist of the Chicago, Burlington & Quincy, exhibited and described a special apparatus which he had devised to determine the burning quality of mineral oils, and Mr Gregory, of the Erie, gave the results of a large number of experiments made with the Armine registering balance. Mr. Hodges, of the Union Pacific, exhibited samples of Shoshone petroleum, which is found along the line of that road in Wyoming Territory, and gave the results of an analysis of its composition.

The influence of free fatty acids contained in animal oils upon the illuminating and lubricating quality of these oils was considered. Mr. Brown cited cases where steam-chests and cylinders had been honey-combed and partially eaten away by the free fatty acids contained in the tallow which had been used to lubricate them. Prof. Denton recalled a case where the cylinder of an engine had been honey-combed in one month by the use of tallow containing free acid.

There was a brief discussion on signal oils. Instances were cited by several members in which oils had failed to burn in lanterns, and it was found that the liquid consisted, not of signal oil, as was supposed, but of various other oils which had been placed in the lanterns through ignorance.

Mahogany for Inside Car Work.

The following notes on the comparative value of mahogany and native woods for car work have been sent us by one who knows a good deal about the subject, and are recommended to the consideration of car-builders. Had our correspondent given a few figures of relative cost of maintenance and construction, and prices of the different woods, his notes would have had a good deal more value. After all, the interior finish of a car is very much governed by considerations of taste and fashion, which change constantly, and the taste for a light general tone may offset considerations of durability. In exterior finish, where varnish deteriorates rapidly under exposure, durability becomes a much more important consideration, and the results of recent experiments in the exterior use of mahogany should be valuable.

"As is known to every wood worker, mahogany has no equal for durability, brilliancy and intrinsic value for any work which requires nicety of detail and elegance of finish. Cherry, which is a pretty wood for effect and extremely pleasing when first finished, soon grows dull and grimy looking from the severe ordeal which railroad use imposes upon any wood. Oak, which has been so much used of late, is attractive when first finished, but every railroad man's experience teaches him that it does not take many months to change all this, and instead of a light fresh looking interior, one that has a dusty appearance is presented, which no amount of scraping and re-finishing will restore to its original beauty. What applies to oak is yet more applicable to ash.

"Mahogany, however, seems to thrive best under the conditions which are detrimental to these other woods. At first, of a light tone, it grows deeper and more beautiful in color with age, and although its first cost is more than these other woods, yet its price is much less than is popularly supposed; and the only objection urged against it has been cost. What is more valuable, however, and what makes mahogany in reality a less costly wood, is the fact that unlike cherry, oak or ash, it is easily cleaned, because it is impervious to dust and dirt, while it does not show wear, and instead of growing duller, grows brighter and more pleasing in appearance. While first cost is more than that of cherry, oak or ash, it is nevertheless true that the judgment of a large proportion of railroad men in the country has led them to regard mahogany as the cheaper wood when its durability and cleanly qualities are considered, and the handsome passenger coaches which are the admiration of tourists give evidence that mahogany has steadily grown in favor, and to-day takes front rank in first-class material. Among woods it is undoubtedly the standard. The objections to oak, ash and cherry, as previously stated, are well known to railroad men. There is no profit in laying up a passenger coach in the repair shop, and there is no satisfaction to the artisan who uses skill and much labor with unsatisfactory results.

Standard Freight Car, Lehigh Valley.

The accompanying illustrations represent the standard 50,000 lb. freight car of the Lehigh Valley. It is designed by Mr. J. S. Lentz, Master Car-builder of the road, and was built at the car shops at Packerton, Pa.

The car possesses many special features, but perhaps the principal one is the employment of a Pratt truss for the body framing. This is stated to have given very satisfactory results, and a car that was built on this plan with green lumber still retains camber after four years' service.

The end posts are stiffened by an iron bar 4 in. by ½ in., bolted to the side of the wood posts. The car has two belt rails, as will be seen from the drawings, and the roof is stiffened laterally by diagonal tie rods, which keep the car body square.

The car is fitted with a grain door, which is exceedingly simple and which permits the use of any odd short pieces of lumber for use as a grain door, without the use of any nails or cleats. It is the invention of Mr. J. H. Heckman, the General Freight Agent of the line. It consists of a casting having vertical grooves, and placed inside the car on one side of the doorway. An eccentric clamp is placed on the other side of the doorway. The boards forming the grain door are placed with one end in the groove, and the other end is clamped, making it perfectly secure, while a simple movement of the handle of the clamp releases the boards, which can then be easily removed. It will be seen that the loose parts, the boards, are cheap, and that the fixed parts cannot be lost or easily injured or destroyed. The advantages of these features will be apparent to all users of freight cars.

The truck is, as will be seen from the drawings, of iron, and is especially strengthened diagonally by tie rods, which keep it square and so prevent cutting of wheel flanges. The spring plank is made of channel iron and the bolster of plates, riveted together, and, in fact, the whole truck except the brake-beams is made of iron.

The axle used under these cars is illustrated in this issue on another page. It is found to have done well, and the

LIST OF TIMBER.

No. required.	Where used.	Kind of lumber.	Sizes finished.	Sizes rough.	Ft. of board measured rough.
2	Side sills	Yellow pine.	5 in. × 8 in. × 33 ft. 6¼ in. s. to s.	5¼ in. × 8¼ in. × 34 ft.	245 ft. 5 in.
4	Centre and intermediate sills	" "	5 in. × 8 in. × 33 ft. 6¼ in. s. to s.	5¼ in. × 8¼ in. × 34 ft.	490 ft. 10 in.
2	Side plates	" "	4 in. × 6 in. × 34 ft. 10¼ in.	4¼ in. × 6¼ in. × 35 ft.	154 ft. 11 in.
1	Ridge pole	" "	3¼ in. × 4½ in. × 34 ft. 10¼ in.	3½ in. × 4½ in. × 35 ft.	45 ft. 11 in.
2	Draw timber braces	" "	4 in. × 5 in. × 21 ft. 10 in.	4¼ in. × 5¼ in. × 22 ft.	81 ft. 9 in.
12	Side sloats	" "	3 in. × 5 in. × 6 ft. 8½ in.	3¼ in. × 5¼ in. × 6 ft. 10 in.	116 ft. 7 in.
4	Carlines	" "	1¼ in. × 3 in. × 34 ft. 10¼ in.	1¼ in. × 3 in. × 35 ft.	43 ft. 9 in.
4	Blind sloats	" "	3 in. × 3½ in. × 2 ft. 10 in.	3¼ in. × 3¾ in. × 3 ft.	12 ft. 2 in.
..	Lining strips	" "	.....	3 in. and 1½ in. / 3½ in. / 1½ in.	37 ft. 11 in.
..	Flooring (net)	" "	1¾ in. × 4½ in.	.....	529 ft. 10 in.
2	End sills	Oak.	8 in. × 8 in. × 8 ft. 6½ in.	8¼ in. × 8¼ in. × 8 ft. 9 in.	99 ft. 3 in.
2	Buffer blocks	"	4 in. × 8½ in. × 2 ft. 8 in.	4¼ in. × 8¾ in. × 2 ft. 9 in.	17 ft. 0 in.
4	Draw timbers	"	5 in. × 7¾ in. × 6 ft. 11 in.	5¼ in. × 8 in. × 7 ft. 1 in.	99 ft. 1 in.
4	" strips	"	.....	1 in. × 2½ in. × 2 ft. 1½ in.	1 ft. 11 in.
2	Brake steps	"	1¾ in. × 10 in. × 2 ft.	2 in. × 10¼ in. × 2 ft. 2 in.	7 ft. 4 in.
2	Ladder rails	"	1¾ in. × 2½ in. × 7 ft.	2 in. × 2¾ in. × 7 ft. 3 in.	6 ft. 7 in.
2	" "	"	1¾ in. × 2½ in. × 7 ft. 10 in.	2 in. × 2¾ in. × 8 ft.	7 ft. 4 in.
11	Running b'd strips	"	2¼ in. × 2½ in. × 1 ft. 11 in.	2¼ in. × 2½ in. × 2 ft.	10 ft. 3 in.
2	Cross frame tie timbers	"	4 in. × 10 in. × 8 ft. 8¼ in.	4¼ in. × 10¼ in. × 8 ft. 10 in.	64 ft. 1 in.
2	End plates	"	4 in × 11½ in. × 8 ft. 11 in.	4¼ in. × 12 in. × 9 ft.	76 ft. 6 in.
4	Rafters	"	2¼ in. × 6½ in. × 8 ft. 11 in.	2½ in. × 7 in. × 9 ft	52 ft. 6 in.
15	Carlines	"	2¼ in. × 2½ in. × 8 ft. 11 in.	2¼ in. × 2¾ in. × 9 ft	146 ft. 0 in.
5	" ribs	"	2 in. × 2½ in. × 6 ft. 2 in.	2½ in. × 2¾ in. × 6 ft. 4 in.	18 ft. 1 in.
2	End belt rails	"	1½ in. × 5 in. × 8 ft. 2¼ in.	1¾ in. × 5¼ in. × 8 ft. 4 in.	12 ft. 9 in.
2	" " "	"	4 in. × 5 in. × 8 ft. 2¼ in.	4¼ in. × 5¼ in. × 8 ft. 4 in.	29 ft. 7 in.
4	Side " "	"	1¼ in. × 4 in. × 14 ft. 0½ in.	1¾ in. × 4¼ in. × 14 ft. 2 in.	35 ft. 1 in.
4	" " "	"	2¾ in. × 4 in. × 14 ft. 0½ in.	3 in. × 4¼ in. × 14 ft. 2 in.	60 ft. 2 in.
4	Door posts	"	4 in. × 4½ in. × 6 ft. 8½ in.	4¼ in. × 4¾ in. × 6 ft. 10 in.	45 ft. 11 in.
2	" stops	"	2 in. × 4 in. × 7 ft. 1½ in.	2¼ in. × 2¾ in. × 7 ft. 3 in.	6 ft. 1 in.
4	Corner posts	"	4½ in. × 6 in. × 6 ft. 8½ in.	4¾ in. × 6¼ in. × 6 ft. 10 in.	67 ft. 7 in.
4	End sloats	"	4 in. × 4 in. × 6 ft. 8½ in.	4¼ in. × 4¼ in. × 6 ft. 10 in.	41 ft. 1 in.
4	" braces	"	4 in. × 4 in. × 7 ft. 0 in.	4¼ in. × 4¼ in. × 7 ft. 3 in.	43 ft. 7 in.
2	Face boards for door	White pine.	⅞ in. × 8 in. × 11 ft. 0¼ in.	1 in. × 8¼ in. × 11 ft. 3 in.	15 ft. 5 in.
4	" b'd blocks "	" "	2⅞ × 8 in. × 0 ft. 4½ in.	4 in. × 8¼ in. × 0 ft. 6 in.	5 ft. 6 in.
4	End cornice boards	" "	1¼ in. × 5 in. × 4 ft. 8 in.	1½ in. × 5¼ in. × 4 ft. 10 in.	12 ft. 8 in.
2	Side " "	" "	1¼ in. × 5 in. × 9 ft. 0½ in.	1½ in. × 5¼ in. × 9 ft. 3 in.	12 ft. 1 in.
2	" " "	" "	1¼ in. × 5 in. × 14 ft. 8 in.	1½ in. × 5¼ in. × 14 ft. 10 in.	19 ft. 5 in.
2	" " strips	" "	½ in. × 2¼ in. × 35 ft. 0 in.	¾ in. × 2½ in. × 35 ft. 0 in.	10 ft. 11 in.
	" " blocks	" "	½ in. × 2¼ in. × 0 ft. 4½ in.	.....	3 ft. 0 in.
2	Running board ties	" "	1¾ in. × 5½ in. × 1 ft. 11 in.	1¾ in. × 5½ in. × 2 ft. 0 in.	3 ft. 2 in.
2	Door rails	" "	1½ in. × 1¾ in. × 11 ft. 0¼ in.	1¾ in. × 2 in. × 11 ft. 3 in.	6 ft. 6 in.
	Roof sheathing (nett)	" "	.....	.....	336 ft. 0 in.
	Body sheathing and doors (nett)	" "	.....	.....	700 ft. 10 in.
	" lining	" "	.....	.....	330 ft. 0 in.
4	Door stiles	Ash.	1⅞ in. × 5 in. × 7 ft. 0½ in.	2¼ in. × 5¼ in. × 7 ft. 3 in.	28 ft. 6 in.
2	Top rails for doors	"	1⅞ in. × 5 in. × 5 ft. 6½ in.	2¼ in. × 5¼ in. × 5 ft. 9 in.	11 ft. 3 in.
2	Lock " "	"	1 in. × 7 in. × 5 ft. 6½ in.	1¼ in. × 7¼ in. × 5 ft. 9 in.	8 ft. 8 in.
2	Bottom rails for doors	"	1 in. × 7 in. × 5 ft. 6½ in.	1¼ in. × 7¼ in. × 5 ft. 9 in.	8 ft. 8 in.
3	Running boards	Hemlock.	1¼ in. × 7 in. × 36 ft. 3½ in.	1¼ in. × 7 in. × 36 ft. 6 in.	79 ft. 10 in.
4	Brake beams	Hickory.	3¾ in. × 6½ in. × 5 ft. 6¼ in.	4 in. × 6¾ in. × 5 ft. 8 in.	51 ft. 0 in.
					4.350 ft. 3 in.

NOTE.—End plates, carlines and ra fters are circled from plank.

boxes are not oiled on the average more than once a month. Vulcanized fibre washers are used as dust-guards. They are punched out of sheets by a special machine designed for that purpose by one of the foremen at the Packerton shops. This machine punches the washer and throws it out at the same operation.

The main dimensions of the car are as follows:

Capacity	50,000	lbs.	
Weight	29,300	"	
Length over end sills	35	ft. 0	in.
Breadth " "	8	" 8¼	"
Length inside at floor	34	" 0	"
Width " "	8	" 0	"
Height from floor to top of upper belt rail	5	" 0	"
" of doorway in the clear	6	" 7¾	"
Width " " "	5	" 4	"
Extreme width over roof	9	" 7¾	"
" length "	36	" 3½	"
Height from rail to top of running board	12	" 1¾	"
" " " brakestaff	12	" 10	"
Extreme length over draw-heads	36	" 10⅝	"
Wheel base each truck	5	" 0	"
Distance between centres of trucks	25	" 0	"

The Curtis Balanced Steam Trap.

The accompanying illustrations show an improvement in the Edwards steam trap as made by the Curtis Regulator Co. of Boston. It is claimed that this trap will take care of any condensation, much or little, at any pressure, high or low, and even with no pressure at all in the trap. It is said to have been adopted exclusively on the system known as the Superheated Water System of Boston, in which the street pressure of 400 lbs. to the inch is reduced to 5 to 10 lbs. for heating, and to 60 to 100 lbs. for running steam-engines, using this trap, through which to return the water into the return pipe to the station.

The improvement consists in making the chamber of the trap in one piece, with rounded ends and a nozzle on the side, on the cover of which is placed the balanced valve, and which, when removed, brings with it the stem and float and all the working parts, while the shell may remain in place and connected.

It will be seen (in the sectional view) that, as the float rises its stem moves up an incline, rotating the valve a little and moving it endways off its seat, giving a clear opening equal to the area of the outlet pipe; as it falls the incline forces the valve to its seat, thereby maintaining a water line in the trap of sufficient height to keep the outlet well sealed with water, thus precluding the possibility of an escape of steam.

The float is of cast composition, very stiff, and guaranteed to stand 150 lbs. pressure. It is perfectly spherical, and is ventilated through its hollow stem into the open air so that it can never fill with water. The closing is so gradual that there is no possibility of water-hammer. The glass gauge shows the internal condition of the trap at a glance, while the pass-by valve in the top of the outlet-port enables the trap to be blown entirely out, or its working to be continued, if for any reason the float valve fails to open.

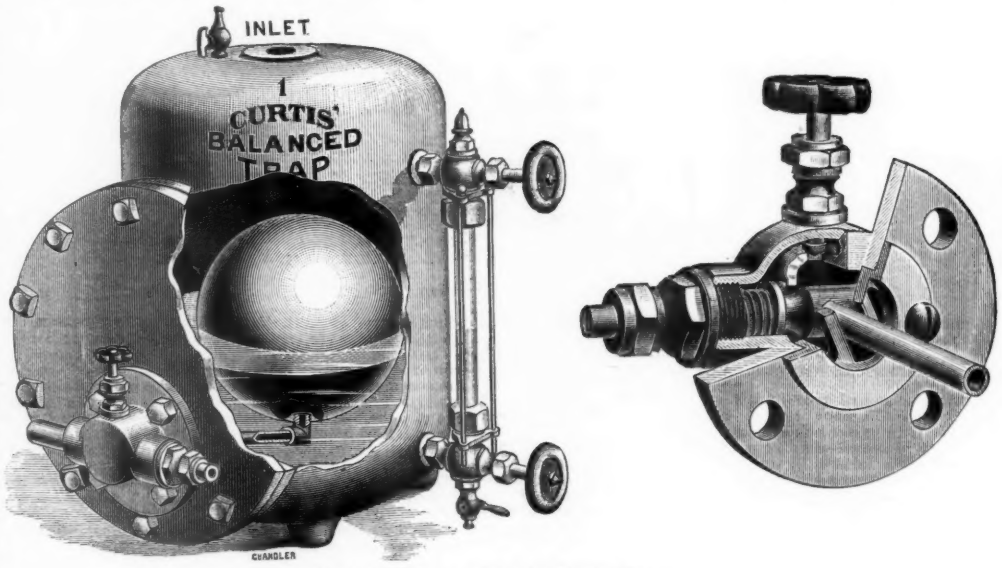
Superheated Steam and Reheaters.

Superheated steam is used as a motive fluid in engines and for all purposes of heating, boiling, cooking and drying to which steam plants are adapted. The advantages of using superheated rather than saturated steam for such purposes can easily be explained.

If steam is required for driving an engine, superheated steam, having a greater volume than an equal weight of saturated steam at the same pressure, will produce a given amount of power with greater economy; possessing the additional advantage over saturated steam, that it can supply from itself the heat required for the work of expansion, and the heat radiated without permitting the great losses which result from actual condensation within the cylinder. These facts are perfectly familiar to experienced engineers.

With regard to the other purposes for which steam is employed, there does not appear to be such a general consent as to the advantage of superheated over saturated steam. In many industrial operations the steam used for power is a small proportion of the total steam consumption. The same statement will apply to many public buildings and hotels, where the amount of steam used for heating exceeds that consumed by the engines and pumps. In establishments like the preceding, it is customary to utilize the exhaust steam from the non-condensing engines, at a back-pressure of from 8 to 20 lbs. per sq. in. above the atmosphere, for heating purposes, supplementing the deficiency by live steam reduced to the pressure of the exhaust. This represents the most general practice; but there are many cases where high temperatures, which cannot be produced with exhaust steam, are required, for example, in the reduction of animal blood, in vulcanizing and in making certain extracts. When saturated steam is used for this kind of heating its pressure is necessarily quite high, frequently dangerously high, as proven by numerous explosions of heating tanks and boilers. Obviously, in all such operations as have been specified, the saturated steam could advantageously be replaced by superheated steam of low pressure, reducing the excessive back pressure on the pistons of the steam engines, and removing all source of danger from the large tanks and boilers in which high temperatures are required.

The use of heated air in close chambers, for drying lumber, textile fabrics, paper, earth, sand, etc., constitutes a large industry, considered by itself. The majority of drying-rooms contain coils of pipe in which steam circulates, heating air which enters from without, passes around or among the articles to be dried, and either escapes through openings by natural draft or is drawn off by a suction blower. It is rarely that one sees a drying room which gives complete satisfaction in every respect, and the usual complaint is that the temperature is too low. In many cases more heating coils are introduced without effecting very decided gain.



THE CURTIS BALANCED STEAM TRAP.

The principles of drying with hot air are very simple, and their application shows that in order to obtain satisfactory results it is necessary to secure high temperatures. One advantage of increasing the temperature of the heating medium is that the rate of heating increases more rapidly than is due to the simple difference between the internal and external temperatures of the heating-pipe. But a more important point in problems of drying with hot air, is the fact that the capacity of air to absorb moisture increases very rapidly with rise of temperature, and an immense advantage can be realized by making a drying-room hotter.

The Hussey Re-heater and Steam Plant Improvement Co., 15 Cortlandt street, N. Y., have sent us sketches and data relating to their re-heater for exhaust steam and superheater for live steam. This apparatus consists, as shown by fig. 1, of a coil of 2-inch pipes, with return bends, the inlet and outlet being connected to cylindrical headers. This coil is placed in such part of the chimney flue of a boiler as may be most convenient, and is thus exposed to contact with the

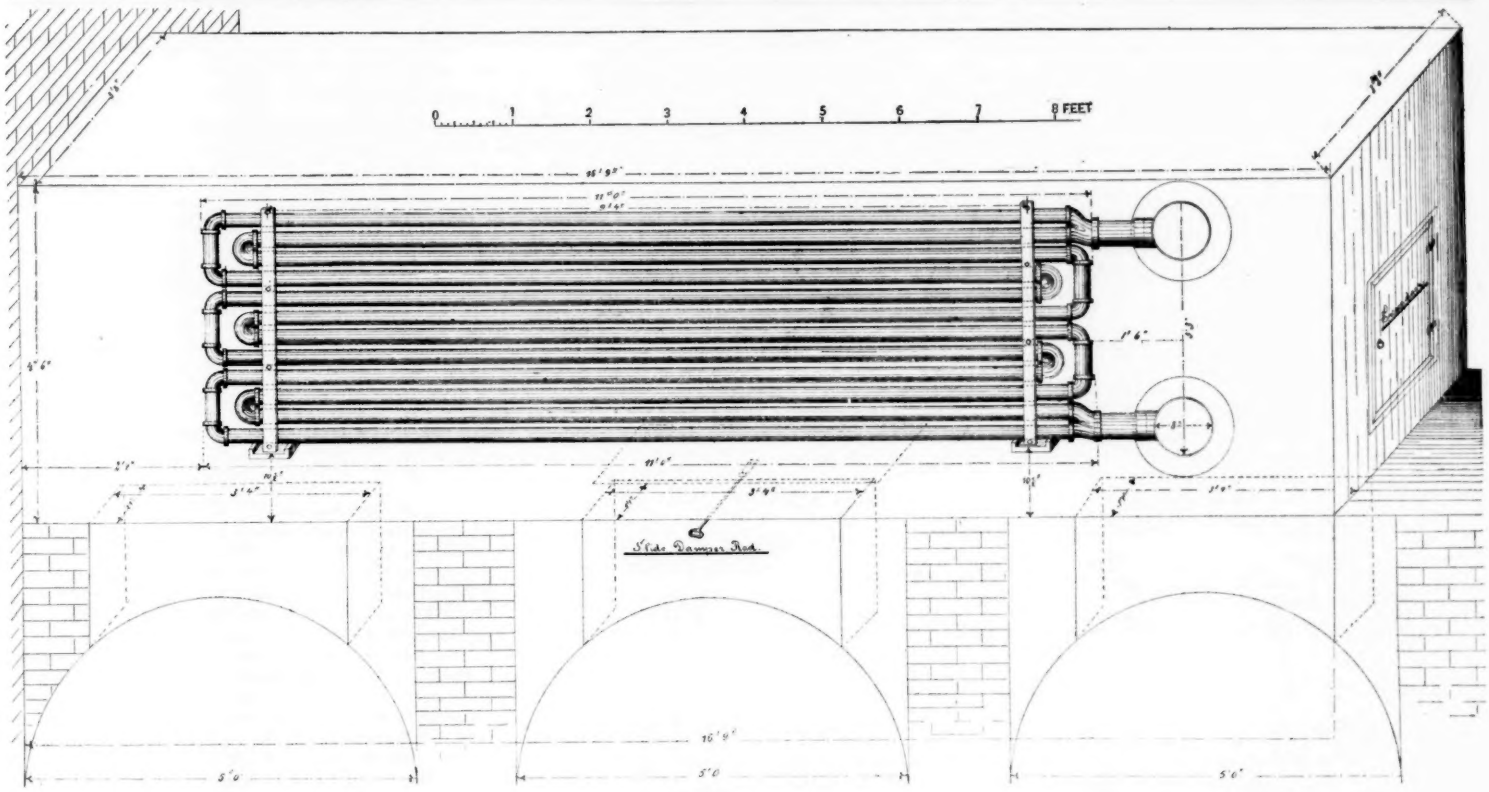


Fig. 1.

THE HUSSEY RE-HEATER.

Made by the HUSSEY RE-HEATER AND STEAM POWER IMPROVEMENT CO., *New York.*

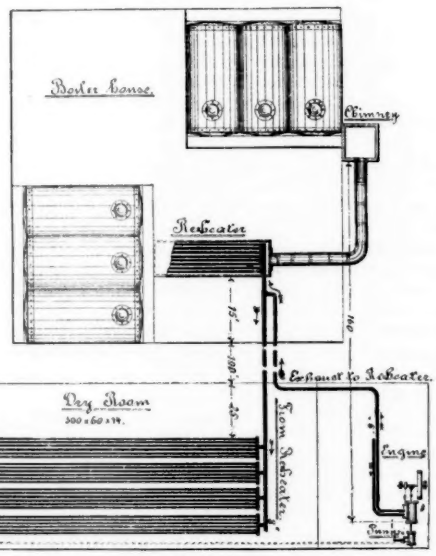


Fig. 2.

products of combustion, or to a range of temperatures of between 300 deg. in the case of a boiler with very slow combustion and moderate draft, and 650 deg. in the case of a boiler with forced draft; and it stated that the superheater is not injuriously affected by the highest temperature noted. The construction of the apparatus is indicated plainly by fig. 1. Care is taken in proportioning the parts to carry full areas in all connections, so as to avoid back pressure. The headers are composed of 8-in. pipe, and there are 8 sections, each connected to the header by a 3-in. pipe, having a Y at the other end for connecting two 2-in. pipes. The re-heater in the sketch is 12 pipes high, and contains 96 pipes in the 8 sections, the heating surface being 675 sq. ft. This size is rated at 75 horse-power, for a flue temperature of 425 deg., a horse-power being considered equal to the evaporation of 30 pounds of water hourly, so that according to this rating the re-heater is suitable for drying and superheating 2,250 lbs. of exhaust steam per hour. The sketch shows the ordinary manner of construction, 8 sections in width and a variation in height, according to the surface required. If a larger header is used the re-heater can be widened by the adding of more sections, or should this construction increase the width too much, sections can be added on the other side of the headers. Obviously there must be great differences in the dimensions of different re-heaters on account of the varying flue temperatures and different amounts of steam to be heated; but the proportions shown above apply to average practice. In connecting the re-heater, the steam to be superheated is admitted into the lower header and discharged at the upper one, so as to facilitate the evaporation of any water mixed with the steam.

The only limit to the temperature which can be imparted to the steam by this apparatus is the flue temperature; because, by varying the proportions, the temperature of the steam may be made practically the same as the temperature of the flue, or as much less as is desirable. Ordinarily there is a difference of from 25° to 50° between the temperatures of flue and superheated steam.

It will be seen that the superheating is effected by this apparatus without cost, the flue being enlarged for its reception, so that the draft is not impaired. As used for exhaust steam, the large areas facilitate the entrance and exit of the steam without perceptible back-pressure.

Fig. 2 shows the application of this re-heater in the chimney flue of three horizontal tubular boilers at the Nonotuck paper mill, Holyoke, Mass. The boilers are each 5 ft. in diameter, 16 ft. long, and contain 60 tubes 3 in. in diameter. The re-heater is proportioned for drying and superheating the exhaust steam furnished by one of the three boilers, after its use in an engine of about 50 horse-power, the diameter of cylinder being 14 in. and the stroke 30 in. The flue temperature is about 400°, and under these circumstances a small superheater is sufficient; and the apparatus in this case is composed of eight sections of 2-in. pipes, eight pipes high; average length, 12 ft., with a heating surface of 450 sq. ft. This example is selected for illustration to show that superheated steam can be effectively transmitted through long lines of pipe. It will be seen that the exhaust steam from the engine passes to the re-heater through a 6-in. pipe, about 150 ft. in length; and that after being dried and superheated, it returns through an 8-in. pipe, about 140 ft. long, to the heating coils of the drying-room. There are five of these coils, each containing six 1¼-in. pipes, 212 ft. long. After passing through these coils, the condensed steam returns by a pipe shown in dotted lines, to the pump, whence it is forced into the boiler. It was found, after attaching the apparatus, that all of the re-heated steam was not condensed in the coils, or, in other words, that the exhaust from the engine, when dried and superheated, was more than sufficient for heating the drying-room; and this surplus steam, which passed through the coils uncondensed, was conducted in a small pipe to a feed-water heater for the other boilers.

The dimensions of the drying-room are shown in the sketch. The roof of the room contains 22 ventilators or openings, and cold air enters the room through windows and doors. This crude arrangement would have been changed by the Hussey Re-heater Co., had not the results, after the attachment of the apparatus, been such as to fully satisfy the proprietors of the Nonotuck Paper Mill.

The drying-room was originally heated by the exhaust steam from the engine, under a back-pressure of from 8 to 15 lbs. per square inch, according to the weather, supplemented by an unknown quantity of live steam from the boilers, reduced to the pressure of the exhaust. Under these circumstances, the temperature of the drying-room ranged between 84 deg. and 90 deg. After the re-heater was attached, heating the coils with re-heated exhaust steam alone, the long 6 and 8-in. pipes already mentioned being uncovered, the temperature of the drying-room ranged between 115 deg. and 120 deg., a temperature sufficient to dry all the paper with sufficient rapidity; and there was no perceptible back-pressure in the exhaust.

The reader will understand that the statements made in describing the application of the Hussey Re-heater to the Nonotuck Paper Mill are made from notes furnished by the Hussey Re-heater Co.; but we are assured that persons interested can have these statements substantiated on application to the Nonotuck Paper Co.

Railroad Location—Field Practice in the West.*

To know what location is best for a railroad is one thing; to be able to make that location is another, and a very different thing. In other words, it is one thing to be a good locating engineer; it is another thing to be a good chief of a locating party. To be the one does not imply that you are therefore the other, even in point of knowledge. Within the limits of this brief paper is no allusion to the theory or science that is the province of the locating engineer. That field is too broad, and is as yet quite unmapped country to me. It has been said that those who have traversed it the most are most silent about it; while those whose steps have scarcely gone inside its boundaries are most voluble concerning it.

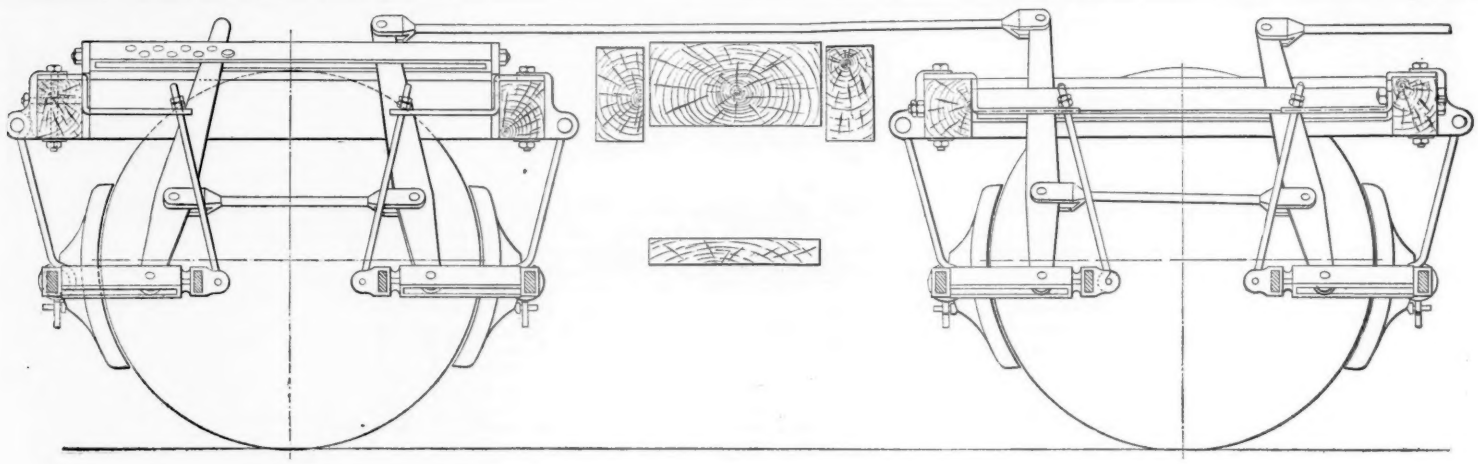
It is my purpose to touch upon the subject of railroad location from that lower plane, the standpoint of a chief of a locating party. It is my wish to call some little attention of the members present to this subject, and so gain the appreciation of at least younger men, who in so large numbers look to the location of our growing railroad system as a promising field for their future work. From these young men who may learn in time to become able chiefs of party, it is hoped that, through study and experience of higher matters, a generation of railroad engineers will develop among whom we may find in the future a few locating engineers of sound theory and able practice.

For this paper, it is assumed that all statistics as to direction and volume of traffic, districts or cities to be passed through, assistant engines to be used, with all kindred topics, have been foreseen and a decision reached. The company building the line, whose will is voiced by its executive board, chief or locating engineer, have issued their instructions. The line is to start at a stated initial point, pass through other points, towns or mining property, and end at a stated terminus. Under certain relative proportions of obstacles met these instructions are qualified. On the route a certain maximum gradient per station of 100 ft. will be used on tangents, and the equivalent maximum gradient on curves. A certain least radius of curvature will be preferably used, and a certain other, and less, radius be in no case passed. The length of this line in excess of least distance through controlling points must be economized, and the incurring of heavy grading not unavoidable must be shunned, all in a degree usual with that company or class of road.

With a full and clear understanding of what his employers wish to do, it now rests with a man employed as a chief of locating party to organize and equip that party, and make all future reconnaissances, preliminaries and location. We pass over all matters pertaining to organization and equipment: that structure too often founded on whim and circumstances, in which the largest room is the room for improvement.

There are two distinct systems of railroad location. From these two or their modifications the chief of party must choose, viz.: 1. Running with his party a preliminary line on all routes or combinations of routes offering any promise through-

* By Willard Beahan, Member of the Engineers' Club of St. Louis. From the *Journal of the Association of Engineering Societies.*



IMPROVED WESTINGHOUSE BRAKE RIGGING.

out the belt possible to occupy. Then from a comparison of their maps and profiles, select the route for the located line. This is the method of "reconnaissance with full party."

2. Topographically surveying and mapping the entire belt of country possible to occupy and then making a paper final location on this map. Then run in this platted location on the ground. This is the method of "office location."

The first method is the one formerly used in a great degree in this country, the second is now used in the old countries, I understand. Each system has its advocates, in a degree, at least. Briefly stated, it appears to me that the objections to the first system are, that it is unsafe and expensive. It is unsafe because you cannot know but that there may exist a better route than any you have occupied, even when you think *all* have been occupied. Then, too, it is possible to follow an excellent route in such a careless way as to condemn it. It is expensive because it usually involves the running of much preliminary line that a close reconnaisance by any one would show to be worthless. Again, it always involves endless backing up. A successful chief of party is known by the amount of backing up he never needs to do. It is the transitman's method. It is slow; it is lazy. It is rough guessing without compass or other aid to map the way in advance. It will never disappear as a method, for any man can use it and draw his salary, and give less equivalent for it than by using any other method.

The objections to the second system are that it takes too much time and costs too much. It is a topographer's method; and it is an office method. No scale is as large as nature's scale; hence, office location is handicapped as against field location. It is unnecessary in easy country; in difficult country it takes a better railroad engineer than topographer to apply it safely, and on a reasonably narrow belt which will always be found to contain the best final location. A modification of this second system is sometimes resorted to by painstaking chiefs of party when they encounter very difficult country for a short distance. It is the student's method, and will be followed by those of less experience in such field work. It appears to me that used on the difficult short portions of a line in connection with an earlier personal reconnaissance of the entire line by an experienced chief of party, much chaining and consequent cost could be saved where it is wished to merely examine a route thought of for future lines.

Instead of following strictly one of the two systems mentioned for railroad location, a rare occurrence in practice, the following modified one is suggested as better, and to it your attention and criticism are invited. The chief of party, having secured the best large-scale map of the region to be passed through, takes his letter of instructions and draws accurately and sharply upon his map a straight line from the initial point to the first controlling point in instructions, from thence straight lines through the successive controlling points to the terminal point. This is a broken right line passing through the primary controlling points. With this map, a pocket prismatic compass, a good hand level, an aneroid and field glasses, he should then ride over the country, keeping as closely as possible by compass or section lines to the pencil lines on the map. He must note carefully how the topography lies with reference to that map, sketching the details. Elevation of main divides above drainage crossed and estimate of distances apart are important. He had better ride over the entire line. He *must* ride to the first primary controlling point beyond the initial point. On his return he should check by repetition his previous aneroid readings. He should especially notice, at points where his pencil line passes over impracticable country, on which side of that line there offers a feasible route *nearest* the pencil line. He must never forget that this pencil line, being the shortest line, is, therefore, the cheapest and best line, other things being equal. His finally located line, whenever it is found on that pencil line, needs no excuse for its being there when obstacles on it are not in sight. But if at any point his finally located line is not on that pencil line, he must be able to give good reasons for it not being there. This philosophy of direction is plainly self-evident, but not one-fourth of the chiefs of party in this country to-day realize the force of it. Of course, the object of his first reconnaissance is to find secondary controlling points. These are topographical points, and before returning to the initial point the chief of party must find the first of the secondary controlling points to be passed through. From that point back to the initial point he must sketch the country, topographically marking natural objects and indicating plainly on this sketch where the line should, in his judgment, be run from the initial to the first of the secondary controlling points. He gives this sketch to the topographer of the party, explaining it fully, and bearing in mind that the topographer must be able to recognize any point from the one back of it. Natural objects, or drainage, crossings of streams or saddles on divides, needle bearings, angles to be turned, horizons shown in outline, or a gradient to be used are among the methods of indicating the route. Details must often be left to the topographer and ample discretion allowed him.

The topographer has charge of the line party during the day; points out the route by the aid of the sketch, and the line is so run. He takes usually wide general topography in easy country, and narrow, close topography in the difficult country. He takes only that which he thinks necessary for preliminary use. At times he must take minute topography; at times he may take very little. This man must be an engineer of experience.

On preliminary running this method is followed from day to day: Each night the chief of party furnishes a sketch and description to guide the topographer for the whole of the next day. Each day the chief of party is steadily on horseback, and with his map and pocket instruments making reconnaissances ahead of the party. He must at all times have selected the most promising route, and have the details marked out, for ten or fifteen miles ahead of the party. He must ride constantly, and except an unusually difficult point be met, he must not be within sight of any of his party in daylight. He must find all routes of any promise whatever, and fully examine them all. He must determine in advance where more than one preliminary is needed, and why. He must do some guessing, but never let it pass without verifying it with some instrument. He must be able to tell with some certainty whether a route is feasible, and whether his alignment or profile will be too difficult. But, if he cannot, as a rule, tell whether a route is reasonably practicable under his instructions without running a line in it with his party, he must resign, and had better go as topographer on some party whose chief has a better eye and judgment.

The preliminaries may be carried through to the terminus or may stop at a controlling primary point. To stop at a secondary controlling point is not so safe. I prefer to stop in 10 or 15 miles, to run all second or modified preliminaries, and then to start locating for a short distance, alternating the one with the other. One can do better work on location when the country and preliminaries in it are fresh in the minds of all. It may occasionally involve abandoning located line, but I have never lost any. It is safe if you have made a correct and far-reaching reconnaissance. This method always presumes that. Each night the transit line of the preliminary is platted to a scale of 1 in. to 1,000 ft. on a continuous roll, and the topography penciled in. The profile is platted and a grade line laid by the chief of party. Before the party has run the last day on preliminary the chief of party must walk over the adopted preliminary line for a distance out from the initial point sufficient for one day's location. He must mark on the map and profile which he carries with him for that purpose where the located line should be placed. Usually the transit line can now be drawn quite closely on the map. The topographer with the aid of these notes, or map and profile, now starts the location, following these directions with discretion. He drops the location when within a safe distance of the end of the present preliminary. The chief of party must examine the located line in the field and see that no errors have occurred. The transit line, topography and levels are platted on location each night, grade line, openings, etc., noted carefully on profile.

The preliminary is now resumed. In difficult bits of country a first preliminary is run with very full and minute topography, and side heights taken well out with the level where slope changes. This part of the line is platted separately to a scale of 1 in. to 100 ft. A grade line is then to be assumed if it be a difficulty through gradient; or an alignment is to be assumed if it be a difficulty arising through alignment. The preliminary as modified on paper must now be run, after which the line can usually be located. While every unusual difficulty is a problem by itself, as a rule, I have found the above plan successful and rapid. In running the modified preliminary where the difficulty arises from gradient the level must be run ahead of the transit to find points for the transit's course. Hand levels can be used on this work instead, but our instrument makers have given us no hand levels as sensitive as good nerves can hold readily. We need hand levels whose bubbles have longer radii. Our prismatic compass is in advance of the hand level in point of sensitiveness and also in portability. In fair weather, by checking back, my aneroid barometer has never misled me, and is an aid. The adverse reports of others who have used gradienters on their transits have deferred me from feeling sure of their value. They are reported unreliable. They would aid the topographer, and I should like information from those who have used them many months on railroad location. If any present can inform me as to the practicability of ribbon chains—sometimes called band chains—for such work it would be information quite appreciated. Link chains wear too much, and on curves their accuracy is less than the transit's sighting and centering. We must make progress in this direction. A ribbon chain must be thoroughly tried.

This system of railroad location has been described as clearly as is easy within the limits of this paper. I trust others will suggest improvements, or a better and entirely different structure. Twelve hundred miles have been run by me in this way for one company, and my efforts and those of excellent assistants have always been to devise improvements. No space offers to discuss details. Some believe that a system should be devised to enable any novice to safely locate a railroad. Is such a system economically possible? Others think that the chief of party described is a man rather hard to find. But to this my reply is that the system grows such men. With a good education, hard work, sturdy health, good habits, good eyes, study, judgment, and that summation of stanch qualities termed manliness, any boy can grow to be a successful chief of locating party. Talent and inspiration I must leave out of the account, as I

NEW CONSTRUCTION AND SURVEYS, JAN. 1 TO MAY 1, 1888—SUPPLEMENTARY TABLE.

NAME OF ROAD.	Track laid between Jan. 1 and May 1, 1888.			Under construction.			Surveyed and under survey.		
	From	To	Miles.	From	To	Miles.	From	To	Miles.
Central of Georgia—									
Savannah & Columbus							Eden, Ga.	Columbus, Ga.	214
Chatt., Rome & Columbus	Chattanooga, Tenn.	La Fayette, Ga.	25	La Fayette, Ga.	Carrolton, Ga.	75			
Chic., Hannibal & Springf'd							Hannibal, Mo.	Springfield, Mo.	256
Denver & Scranton							Scranton, Col.	East line of state	158
Durham & Northern				Durham, N. C.	Henderson, N. C.	41½			
Fresno, B. & Yosemite	Fresno, Cal.	Belmont Colony	1½	Belmont Colony	Eisen Vineyard	7	Eisen Vineyard	Pine Ridge	42
Ga., Carolina & Northern				Monroe, N. C.	Chester, S. C.	54			
Idaho Central							Boise City, Idaho	Rocky Bar	60
K. City, El Paso & Mex.							El Paso, Tex.	White Oaks, N. M.	150
Lake Superior & Pacific							Duluth	northwestward	100
Lake Superior & S. W.							Red Wing, Minn.	Northwood, Iowa	84
Los Angeles & Ocean				Los Angeles, Cal.	San Pedro, Cal.	24			
Marietta, Col. & No.				Big Run Station	Stewart, Ohio	3	Amesville, O.	Corning, O.	14
							Sharpsburg, O.	McLuney	24
				Oil Springs, Ont.	southward	1½			
Michigan Central				Detroit	(belt line)	4			
				Niagara, Ont.	westward	1			
Miss. River & Bonne Terre							Bonne Terre, Mo.	Crystal City	30
Mobile & Birmingham	Atkieson, Ala.	Spratley, Ala.	24½						
Mobile, Hattiesburg & Jackson							Mobile, Ala.	Jackson, Miss.	199
Newcastle & Shen. Valley							Newcastle, Pa.	W. Middlesex, Pa.	13
New York & Northern	Van Cortlandt	Yonkers	3						
Paris, M. & Sabine Pass							Marshall,	Paris, Tex.	130
Pensacola & Memphis							Meridian	Pensacola, Fla.	183
Rio Grande & Utah							Algodones, N. Mex.	Durango, Col.	200
Roanoke & Tar River				Beverly	Lewiston, N. C.	5			
Sabine River							Logansport, La.	Center, Tex.	15
San Fran., Clear L. & Humboldt				Napa, Cal.	Clear Lake	75			
St. John & Halifax	E. Palatka, Fla.	Ralston	3½						
St. Louis & Chicago				Springfield, Ill.	Eureka, Ill.	75	Mt. Olive, Ill.	East St. Louis, Ill.	40
Santa Ana, Fairview & Pac.				Santa Ana, Cal.	Fairview	7½	Fairview	Pacific Ocean	2½
Selma & Cahaba Valley				Selma, Ala.	Bessemer	97			
Ship Island, Ripley & Kentucky	Cherry Creek	Pontotoc, Miss.	8						
Silver Springs, Ocala & Gulf				Dunnellon, Fla.	Homosassa, Fla.	23	Palatka	Ocala	48
				Dunnellon Junction	Bridgers, Fla.	17	Bridgers	Point Pinellas	95
							Gainesville	Juliette	42
Southern Pacific—									
San Pablo & Tulare Ext.				Tracy, Cal.	southward				
Goshen Division				Huron, Cal.	westward				
Springfield, Shelbyv. & Mt. Carmel							Springfield	Effingham, Ill.	75
Syracuse, Geneva & Corning							Penn Yan, N. Y.	westward	1
Tacoma, Ellensburg & C.							Ellensburg, Wash.	Columbia River	33
Temiscouata				Riviere du Loup, Que.	Edmundston, N. B.	81	Main Line	St. Francis	33
Tennessee Central							Jewett, Tenn.	Crossville, Tenn.	14
Tennessee & Coosa							Littleton, Ala.	Huntsville, Ala.	64
Thomasv., Tallahassee & M.	Thomasville, Ga.	southward	3	thence	Monticello	21			
Toledo, Columbus & South'n				Findlay, O.	southward	5			
Toledo, Saginaw & Muskeg'n							Ashley	Flint, Mich.	45
Union (Chattanooga)	St. Elmo	Mountain Junction	1				Orchard Knob, Tenn.	Arno	2¼
Walden's Ridge	Clinton, Tenn.	Oliver's Springs, Tenn.	15						
Warrior Coal Fields				Meridian, Miss.	Gainesville, Ala.	56	Gainesville	Decatur, Ala.	162
Winona & Southwestern							Winona, Minn.	Mason City, Iowa	130
Wisconsin Central				Marshfield, Wis.	westward	5			
			84½			678½			2659

know nothing of them. That this system, when successfully used, is rapid, is evident. If it be rapid, it is therefore cheap. A system based on ample reconnaissance by an experienced man should be safe. It requires faithful, intelligent work on the part of all members of the locating party. It seems to me to possibly resemble the system of the near future for the western railroads of this country.

New Construction.

We publish on this page a table showing new construction on certain roads not included the statement published last week. The table given then showed 1,310 miles of new road. The present one has 84½ miles additional, making a total of 1,394½. This is divided among the states as follows:

Alabama	123.5	North Carolina	21.5
Arkansas	8	Ohio	11
California	164.5	Pennsylvania	3.5
Colorado	130	South Carolina	99
Delaware	11	Tennessee	33.5
Florida	6.5	Texas	56.5
Georgia	125	Virginia	7.5
Idaho	15.5	Washington Territory	26
Illinois	70	Wisconsin	45
Indian Territory	40		
Kansas	96	Total, United States	1,344.5
Kentucky	84		
Massachusetts	2	New Brunswick	2
Michigan	23	Ontario	10
Minnesota	5.5	Quebec	40
Missouri	64		
Mississippi	8	Total, Canada	52
Montana	20		
Nebraska	23	Grand total	1,394.5
New York	16.5		

Improved Westinghouse Brake Rigging.

The accompanying illustration represents an improved form of brake for a four-wheel truck, with the shoes applied on each side of the wheels. The arrangement appears to be strong, simple and efficient, and should conduce to making rapid stops. The dead lever shown in the left hand upper corner of the illustration can be used to take up the slack.

It may be mentioned that the Westinghouse Brake Co. has for many years used a somewhat similar arrangement of shoes and truss rod on European rolling stock, where the practice of using two shoes on each wheel is very general. It is claimed that a train fitted with shoes on both sides of the wheels can be stopped in some 30 ft. less distance and ½ second less time than one with single shoes. This is probably due to the fact that with one shoe only acting on a wheel the journal is forced to one side out of its fair bearing in the brass, and that as this takes time and moreover necessitates an increased travel of the piston, it makes a perceptible difference in the length of the stop.

The advantages of iron brake beams are well understood by all who have studied the question. A wooden brake beam invariably springs and increases the travel of the piston, while an iron beam, especially if made with a deep truss, as shown in the engraving, is stiff and rigid.

The third advantage that may be fairly claimed for the double shoe system is that the wear on each individual shoe is largely diminished, and that, as the breaking power is divided among double the number of shoes, they will at least wear twice as long, and therefore a car can run a very long trip without requiring the wear of the shoes to be taken up.

The slightly increased number of parts and pins gives slightly more slack in the rigging, but this feature certainly appears to be decidedly outbalanced by the advantages of the double shoe system.

Another advantage, independent of the better braking done, is that the pressure on both sides of the wheel being equal, the journal brass, box and pedestals are relieved of all side strains.

A Monument to T. J. Potter.

"The Potter Monument Commission" has been organized in Burlington, Ia., and has issued the following circular:

It is proposed to erect at some point to be hereafter determined a bronze statue heroic size, in memoriam of the late T. J. Potter. His thousands of friends will be glad of the opportunity to thus manifest their appreciation of his noble qualities, the sincerity of his friendship and his fidelity to the interests intrusted to his care. He had notable characteristics worthy of commemoration, and to this end it is proposed to raise a fund by public subscription to defray the cost of a suitable monument or statue.

The undersigned have consented to serve as a commission to have the matter in charge, to raise the necessary funds and procure a suitable statue, and to this end have organized by the election of Capt. Warren Beckwith, of Mount Pleasant, President; Dr. J. J. Ransom, of Burlington, as Treasurer; W. T. Foster, of Burlington Secretary and Agent.

Local committees will be organized in each locality where the public may desire to contribute to the Potter monument fund, the money to be remitted to the Treasurer, Dr. J. J. Ransom, President of the German-American Savings Bank, Burlington, Iowa, and to be paid out upon the order of the commission.

The co-operation of the press and railway men, and the public in general, is earnestly solicited, in order that a fitting memorial to Mr. Potter may be erected. Additional particulars will be furnished by the secretary by mail and he will also visit the various points to secure an organized effort to raise the necessary funds at once.

Warren Beckwith, President; Thomas Miller, Paul Morton, E. L. Lomax, Charles M. Levy, Edw. Campbell, Jr., commission.

J. J. Ransom, Treasurer; W. T. Forster, Secretary.

Iron Cars.

The following letter on this subject appeared recently in the London *Engineer*. The writer, Mr. Thomas Kitson, is an English engineer, who was for many years Superintendent of Motive Power of the Great Luxembourg, a line having a heavy freight traffic, and having a considerable interchange of cars with French, Belgian, Dutch and German roads. Mr. Kitson, therefore, speaks from considerable experience of the merits of iron cars:

On the continent iron is now generally used for the sills and transoms of freight cars, its use having been begun about 23 years ago. First the longitudinal sills were made of iron instead of wood; then the end sills followed as a tentative measure; and then the transoms. Timber diagonals were retained for a long time, probably with the idea that wood affords greater elasticity, but ultimately they gave way to iron; and now nearly the whole frame is made of that material. On the continent too the uprights of both gondola and box wagons are now invariably made of iron, generally channel bars, but sometimes of T section, replacing 4 in. by 3½ in. timber, with a great gain on the core of neatness.

In India it was soon found necessary to make as much of the wagon as possible in iron, on account of the destruction of timber by ants and other insects; and it is surprising that iron and mild steel have not been more used in other countries, as the tendency is for timber to become scarcer, and therefore dearer. The timber has to be sawn and dressed, while iron bars of any required section can be obtained from the rolling mills ready sawn to dead lengths with no fitting required. Channel bars are best for the outside sills, with the flat inside, to which the transoms, etc., are attached with butt joints by riveted angle irons, but joist and double T bars have also been used. All that has to be done is to drill to template the holes for the bolts and rivets; and in the case of a railway company that fixes upon one type for each class of stock, it will be worth while to employ a multiple drilling machine to drill all the holes in each piece simultaneously. Then with all the steam, hydraulic and pneumatic riveters in the market, the closing of the rivets is a very easy matter.

At the same time, I would not advocate the use of metal for the sides, and especially the bottoms of flat and gondola, on account of the great liability to rust from the alternations between damp and dry; and, if adopted for the sides and bottoms of box cars, those parts should be frequently painted. The French, Belgian, German and Austrian railway administrations even employ iron sheets for the panels of their passenger cars, easily perceptible by the metallic clang of the doors on closing, the great heat due to the iron being to a great extent counteracted by the air spaces between the sheet and the matchboard lining. An iron-frame freight car is much more easily repaired than one with timber frame, and may, indeed, be renewed until scarcely anything is left of the original structure; and, when ultimately consigned to the "knacker's yard," the one has a certain appreciable value for being worked up again, while the other is only fit for firewood. I have also noticed that when a train consisting of iron-framed and wooden-framed wagons has come into collision with another, while the timber-framed cars have been smashed to matchwood, the iron-framed, under precisely the same conditions of impact, have been comparatively uninjured, and have, in fact, been restored to service after comparatively slight repairs. Moreover, the iron frame gives a

certain amount of protection to passenger cars in the event of telescoping.

However carefully the timber may have been seasoned, the car is still liable to lose the camber of the sills, owing to the ever varying conditions of temperature and degree of moisture in the atmosphere. In that case the centre line of the sills is removed below the horizontal, setting up strains which greatly diminish the life of the vehicle.

The facility for obtaining a straighter frame with iron bars has doubtless been one of the chief causes in leading continental railway companies and administrations to adopt metal instead of timber for the frames, not only of long sleeping cars, but even for short, four-wheeled gondola cars. There must, indeed, be far greater rigidity in the iron or steel frame, with its riveted angle iron joints, than with one of timber, however carefully put together, unless indeed the scantling of the timber be far in excess of requirements as regards strength; and in such a case there is an excess of weight as well as exaggerated first cost.

The durability of the metal car, if kept properly painted, as a protection against rust, is certainly greater than that of the timber-framed car ; and then, as regards weight, the same strength can be obtained with metal as with wood, weight for weight. Coming to the crucial matter of cost, the iron or steel car can now be made at a very slight extra cost as compared with one of timber ; and this is more than compensated by its longer life, facility for repairs, and value of worn-out material.

Proposed Standard Axle for 60,000-lb. Cars.

The accompanying illustrations represent different proposals for the future standard M. C. B. axle for 60,000-lb. cars. Figures 1, 2, 3 and 4 represent the axle and box as proposed by Mr. William Forsyth, mechanical engineer of the Chicago, Burlington & Quincy, and discussed at the recent meeting of the Western Railway Club. Fig. 1 represents the axle as designed for use under a 60,000-lb. car, and fig. 2 shows it in position in the standard M. C. B. box, with a special brass suitable for the longer journal. Fig. 2 shows the axle as turned down after having worn under the heavy car, and fig. 4 shows the reduced axle as applied under a 40,000-lb. car. It will be seen that it works against an end stop. It is believed that cast iron will be sufficient for the purpose, as it makes a good bearing for shafting, for locomotive cross-head shoes, etc., its wear and endurance being remarkable. The stop, however, can be made of brass if thought desirable. It will be observed that in the drawing no allowance has been made for the journal wearing shorter, and that, though the diameter is diminished, the length is the same under the 40,000-lb. car as under the 60,000-lb. car. But it is obvious that if it wore shorter under the heavy car, it could be faced up and a thicker stop placed in the box of the 40,000-lb. car. Fig. 5 shows the axle which the Chicago, Burlington & Quincy consider most suitable for adoption. Fig 6 shows the axle which is now in use under heavy capacity cars on the Lehigh Valley. It will be seen that these axles differ somewhat in diameter, as shown in the following table :

	Mr. W. Forsyth.	Chicago, Burlington & Quincy.	Lehigh Valley.	Present M. C. B. Standard
Diameter at centre	4¾	4⅜	4⅜	4¼
" at outside hub.	5½	5⅜	5⅛	5
" in hub	5⅜	5¼	5	4⅞
" dustguard	5	5	4⅞	4¾
" journal	4¼	4¼	4	3¾
" collar			4⅞	4¼

The lengths are practically identical, though the Lehigh Valley journal, which has a collar, is ½ in. shorter than the Chicago, Burlington & Quincy. It is generally conceded that the strength of an axle varies as the cube of its diameter, and taking the M. C. B. strengthened standard, in which the diameter is 4¼ in. at the centre, the strength of the other axles is as follows :

	A.	B.	Equivalent capacity of car. lbs.
Present M. C. B. standard	100	100	40 000
Lehigh Valley	109	108	43,200
Chicago, Burlington & Quincy	132	125	50,000
Mr. Forsyth's	149	134	53,600

Column A is reckoned on the basis of the diameter of the centre, and column B gives the relative strengths of the axles as regards the diameter in the hub. It would appear therefore that if the present M. C. B. axle is sufficiently strong for a 40,000-lb. car, the Lehigh Valley axle is suitable for a car of 43,200 lbs. capacity. Of course it may be urged, and with some reason, that the present M. C. B. axle is more than sufficiently strong for an ordinary car of 40,000 lbs. capacity, and that it is running successfully under many 50,000-lb. cars. It is well, however, in adopting a standard to look ahead and adopt dimensions that will be fully equal to the probable increased weight of cars and higher speeds which are likely to prevail a few years hence.

As regards the journal it may be pointed out that multiplying the length and diameter of the present M. C. B. journal, 7 in. by 3¾ in., gives an area of 26.25 sq. in. It may be assumed that the future 60,000-lb. car will weigh empty at least 50 per cent. more than the present 40,000-lb. car, and therefore the journal will have 50 per cent. greater load to carry. If its area is to bear the same proportion to load as at present, the dimensions should give an area of 39.375 sq. in.

This could be attained by a journal measuring 9 × 4⅜ in., which is somewhat larger than any of those illustrated, all of which have at least 10 per cent. less area than that indicated above. Such a large journal would undoubtedly confer great advantages, but it would, of course, necessitate the adoption of a new standard journal box and brass, but the greater strength and durability of the larger journal and the diminished tendency to run hot and consume oil, brass, and waste, spoil axles and delay trains are strong arguments in favor of giving ample bearing surface even at the expense of adopting new standards, suitable to a 50 per cent. increase in the weight and capacity of cars.

Fig. 1.—Axle for 60,000 lb. Cars, proposed by Mr. W. Forsyth.

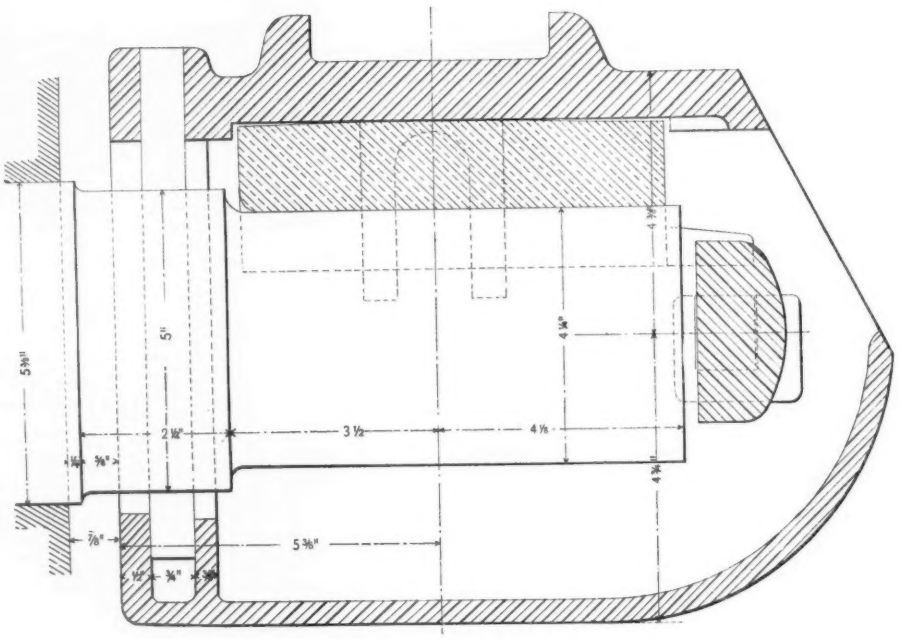


Fig. 2.—Mr. Forsyth's Proposed Axle under 60,000 lb. Car

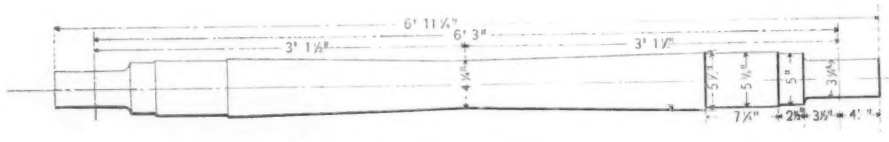


Fig. 3.—Axle in Fig. 1 when Worn.

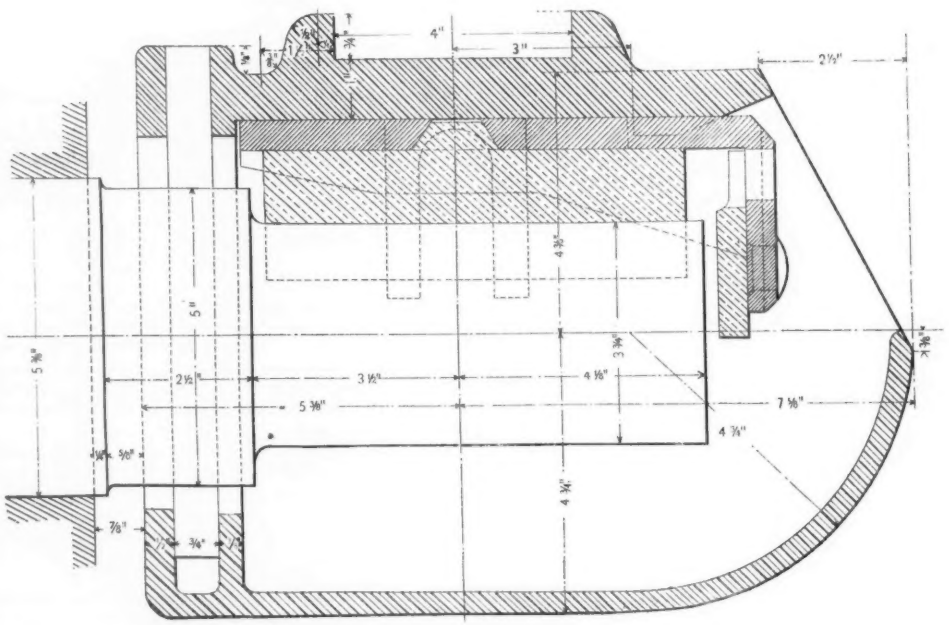


Fig. 4.—Mr. Forsyth's Axle when Worn and Used under 40,000-lb. Car.

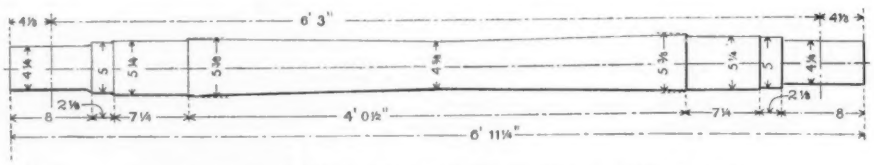


Fig. 5.—Axle for 60,000-lb. Cars, Chicago, Burlington & Quincy Railroad.

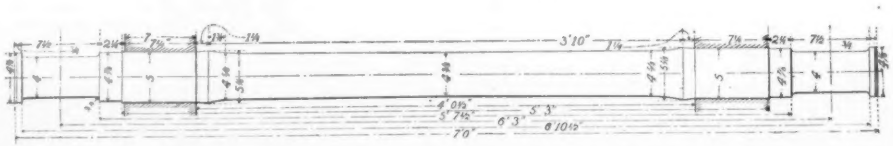


Fig. 6.—Axle for Heavy Capacity Cars, Lehigh Valley Railroad.

PROPOSED STANDARD AXLES FOR 60,000-LB. CARS.

TECHNICAL.

Car Notes.

The Indianapolis Car & Manufacturing Co., of Indianapolis, Ind., has completed 200 gondola cars for the Cleveland, Columbus, Cincinnati & Indianapolis, and it is stated that an order is now pending for another 100 cars of the same pattern. The C., C., C. & I. has just completed a handsome new pay car at its shops at Brightwood, Ind.

The Jacksonville & Mayport has received six additional platform cars, and several others are also on the way, as well as several passenger and baggage cars.

The Lehigh Car Manufacturing Co., of Stemton, Pa., has lately completed 500 hopper coal cars of 25 tons capacity. The firm has also lately completed several orders for export and for the Pioneer Iron Works at Birmingham, Ala., and is at work on an order for a Cuban road.

The Pullman Car Co. has shipped during the past fortnight the following cars, among others: Ten passenger and 85 box, for the Chicago & Northwestern; three sleeping for the St. Louis & San Francisco; four sleeping, 4 mail, and 4 passenger cars for the Atchison, Topeka & Santa Fe; thirty-two sets of trucks, 16 flat, and one box car, for the Northern California; four sleeping, for the Chicago & Alton; twelve emigrant sleepers, for the Union Pacific; three dining-cars, for the Pennsylvania.

The orders placed in the car-shops during the week were for three sleepers, 250 box, 150 gondola and 50 flat cars.

Twenty-six tourist cars are being constructed at the Sacramento shops of the Southern Pacific for the Newport News & Mississippi Valley. At ten cents a mile the cost of transporting these cars from Sacramento to the Mississippi River will be something like $200.

The Muskegon Car Co., of Muskegon, Mich., has increased its facilities, and is now making 12 cars daily, and expects soon to be able to turn out 20. The company has sufficient orders to run to the full capacity for some months. The erection of a car-wheel foundry is contemplated.

Bridge Notes.

The plans for the bridges of the Pensacola & Memphis over the Tombigbee and Alabama rivers and other streams on the line are expected to be completed this month, when contracts for erecting them will be let.

The Canton Wrought Iron Bridge Co., of Canton, Ohio, has contracted to rebuild the bridge across New River at Fayette Station, W. Va. The original bridge was built by them.

The following bids for erecting an iron bridge at Independence, Mo., were opened May 26 by the County Surveyor, the specifications being made by the bidders: Kansas City Bridge & Iron Co., Kansas City, Mo., three bids, $7,500, $10,250, $8,300; Milwaukee Bridge & Iron Works, four bids, $8,586, $8,800, $8,686, $8,457; King Iron Bridge & Mfg. Co., Cleveland, O., two bids, $8,400, $8,200; Missouri Valley Bridge & Iron Works, Leavenworth, Kan., $7,315; Mt. Vernon Bridge Co., Mt. Vernon, O., $7,489; Smith Bridge Co., Toledo, O., $10,402.26; Wrought Iron Bridge Co., Toledo, O., $8,250; Minneapolis Bridge Co., Minneapolis, Minn., $8,000; Decatur Iron Bridge & Construction Co., Decatur, Ala., $9,840; E. E. Rankin, Agent, $8,700. The contract was awarded to the Kansas City Bridge & Iron Co. at $7,500.

It is stated that a pontoon bridge will be built at Plattsmouth, Nev., at a cost of $20,000. Address S. N. Stewart.

The county commissioners will construct a pontoon bridge across the Missouri River at Randolph, Kan. Cost, $50,000. Address T. B. Bullene, Kansas City, Mo.

Manufacturing and Business.

The Curtis Regulator Co., of Boston, Mass., have placed, among others, the following orders during the last month: One three inch pump regulator for Baltimore; 12 regulators for the Pullman Car Co.; five for the American Steam Gauge Co.; 63 water pressure regulators; six locomotive regulators for Chicago; two pump regulators for the Davidson Pump Co.; one three-inch for the Whittier Machine Co.

The Mason Regulator Co., of Boston, Mass., has recently placed a number of its pump pressure regulators with the Whittier Machine Co. They are to be used on steam pumps connected with the Whittier elevator systems.

The Inter-state Railway Construction Co. has been incorporated at Little Rock, Ark., with a capital stock of $500,000, for the purpose of building railroads and telegraph and telephone lines in Arkansas and adjoining states. J. B. Simpson, Dallas, Tex., is president.

J. S. Mundy, Newark, N. J., has just delivered to the New York, Chicago & St. Louis an engine for pile driving and pumping, and to the Keystone Bridge Co. a special six-drum bridge-building engine to be used on the new Kill von Kull bridge.

The Indianapolis Union Railroad has awarded the contract for the seats to be placed in the new depot, Indianapolis, to Ford & Johnson, Michigan City, Ind.

The American Railway Fence Co. has been organized in Michigan for the manufacture of metallic fence posts, with a capital stock of $200,000. Frank B. Preston and Charles H. Thompson are stockholders.

J. D. Cook, Consulting Engineer, Toledo, O., will receive proposals until June 13, for erecting a pumping engine with a daily capacity of 7,500,000 gallons.

The New York Iron Roofing & Corrugating Co. report a number of orders for their iron roofing and siding from foreign countries. Among them is a second order for 50,000 sq. ft. to Mexico. The company has also recently shipped the material for roofing a large warehouse on one of the great lakes, and has been awarded the contract for covering a large elevator in Buffalo.

A communication from Messrs. Pratt & Whitney informs us that the late fire in the establishment of C. H. De Lamater & Co. has seriously interfered with their work and made it very inconvenient for them to continue the manufacture of the double spiral lip punches and punching machines, patented by D. L. Kennedy, New York. Upon the suggestion of De Lamater & Co. the Pratt & Whitney Co., of Hartford, Conn., has bought out the business and will hereafter make the punches as sole manufacturers under an arrangement with the patentee. A large assortment of tools is now ready for delivery, not having been damaged by fire, and such as are not in stock and special styles can very soon be made.

The South Florida road has asked for bids for 50 miles of wire fence.

Iron and Steel.

The employés of the National Tube Works of McKeesport, Pa., have decided to accept the reduction in their wages of five per cent., and the proposition has been accepted by the company. It had previously notified them of an intended reduction of from 7½ to 15 per cent.

The Colorado Coal & Iron Co. has received the contract for rolling the steel rails for the Seattle, Lake Shore & Eastern. It is expected that the entire works of the company at South Pueblo, Colo., will be in operation this month. These works have an annual capacity of 50,000 tons of steel rails.

Cofrode & Evans, of Pottstown, Pa., have been awarded the contract for erecting the rolling mills of the Roanoke Rolling Mill Co., of Roanoke, Va.

The Blandon Rolling Mill Co., of Blandon, Pa., has closed its mill, which employed about 200 hands.

The Rail Market.

Steel Rails.—The market continues very dull, with a sale of about 2,000 tons at $31.50 delivered at tide water, and of 5 000 tons by a mill in Western Pennsylvania. Quotations: $30.50@$31 at Eastern mills.

Old Rails.—The market is dull, with no important transactions reported. Quotations nominally at $20@20.50 for tees.

Rail Fastenings.—Quotations $2@$2.10 for spikes and $1.85@$1.90 for angle-plates, delivered.

Brake Notes.

It is stated that the whole equipment, freight and passenger, of the New York, Chicago & St. Louis (Nickel Plate) will be fitted with the improved quick acting Westinghouse brake.

Car Heating Notes.

It is said that continuous steam heating is to be tried on the Illinois Central next winter. Mr. W. B. Snow, Master Car-Builder, has been examining into the merits of the Graydon method of heating trains by steam from the locomotive, and is reported to be well pleased with the device.

The Gold improved continuous steam-heating coupler, with automatic vacuum trap, has been adopted for the entire systems of the Manhattan Elevated, after being tested on 400 cars on the Third Avenue line last winter.

New Track Lifter.

Mr. Gavin Rainnie, late trackmaster of the Northern Division of the New Brunswick railroad, has patented a track lifter, which is said to be simple in construction, easily operated, and strong and durable. The lifter only weighs 28 lbs., and can therefore be carried without any difficulty. It also acts as a turn-table for the hand-car on which the machine is carried.

A Long Switch Rod.

The Lehigh Valley is putting in at Glen Onoko, Pa., a gas pipe connection for a switch, which is 1,255 feet from the point where it is operated. The device is put in under the direction of Dr. H. K. Whitner, the patentee of the Whitner uni-lever switch. The station at this place is situated on a steep grade and on a short tangent. About 500 feet below the station the line curves sharply to the left, and at this point begins a third track, between the two main tracks. The third track is used for freight trains only, and the switch at the entrance of this track has hitherto been operated by the trainmen, who, when handling heavy trains down the grade, would detach the engine some distance above and run ahead rapidly enough to give time for a man to get off and turn the switch before the cars reached it. About 700 feet above the station (1,255 feet from the switch) is a signal man, and the new connection is put in to enable the switch to be tended by this man. The gas pipe for the first 700 ft. from the switchman's cabin is 1¼ in. At the end of this it crosses underneath the track, the bell cranks at these two turns being placed so as to act as compensators, and the pipe of the remaining distance is 1 in. in diameter. The pipe has to pass gentle curves in the track near each end, but it is run in straight lines and V cranks put in to change the direction. The large pipe is supported every 10 ft. and the smaller every 8 ft. This is believed to be the longest switch connection in use anywhere. At night the man in the cabin knows when a train has passed the switch by the movement of the tail lights, the curve in the line beginning immediately beyond the switch. In case of fog he would have to depend upon whistle signals.

At another point on the Lehigh Valley where Dr. Whitner's levers are in use, a range light is employed to facilitate switching at long distance in the night. The switch tender, who is 264 feet from the switch and over 300 feet from the point where cars in going to the side track clear the main track, has a small light fixed on a post in such a position that the movement of the cars always hides the light from him while they are foul of the switch and exposes it to view as soon as they have gone far enough to clear.

It will be interesting to know whether this long switch rod works successfully, as the expansion and contraction, even with the best know methods of compensation, always make the exact movement of a switch a matter of difficulty and uncertainty when long switch rods are used. The rod with connections, etc., may be estimated to weigh fully 1,500 lbs., and this feature alone constitutes a formidable difficulty in moving the switch.

Alton Vestibule Trains.

The Chicago & Alton is the first road to run vestibule trains into St. Louis. The new cars, which were built by the Pullman Co., consist of a private compartment car and a sixteen section sleeper. They are mounted on six-wheel trucks, equipped with the Allen paper wheels, and are said to weigh 45 tons each and measure 75 ft. 6 in. long. The compartment car is composed of three private rooms, a drawing room, six sections, a smoking room and a buffet. The body of the cars, or the ordinary sleeping car sections, are finished with a plain and massive mahogany, furnished and upholstered in peacock blue silk plush. The private rooms and drawing rooms are finished in white enamel and gilt, and upholstered in crushed strawberry. Each private room and the drawing room has complete toilet, with hot and cold water. The smoking rooms are finished in plain mahogany, and upholstered in a bright green. There is a large and commodious toilet room for gentlemen, and two large toilet rooms for ladies. This is a new feature, which the ladies will undoubtedly appreciate, as the complaint has been pretty general that there was not sufficient toilet accommodation for the ladies on Pullman sleepers. The sixteen section car, like the private compartment car, is finished in plain and massive mahogany, and upholstered throughout with curtains and lambrequins of peacock blue silk plush. The chandeliers are of a special design and manufacture, and give a light of 130 candle power. The arrangement of the buffet is original, and makes a very handsome effect in entering the body of the car.

The Grime Valve Gear.

The Grime valve gear, which was tried on the Burlington, Cedar Rapids & Northern last winter, has been applied in an improved form to a locomotive on the Northern Pacific. A test made at Minneapolis on the 28th ult. is said to have given very satisfactory results.

Boston Automatic Car Coupler.

The makers of this coupler are now ready to manufacture their new automatic coupler on the lines of the M. C. B. standard. They have several orders, which they are filling as rapidly as possible.

THE SCRAP HEAP.

A Leaky Throttle.

Once upon a time there was a scrap heap that had a leaky throttle; some of the wipers swore that it was so used to leaking that steam would continue to blow out of cylinder cocks when the boiler was cold. This engine used to stand in the roundhouse and hiss at everything that was said. Then she would go out on the train and sizzle away till leaving time. Once in a while the engineer would stop at a tank, get her just right, and then start on a tour of lubrication, forgetting to open the cylinder cocks. The leaker would stand this for a minute or two and say nothing, then she would swell up with indignation, and, when the long oiler was after a far-off eccentric through the spokes of a driving wheel, make a sudden lunge ahead, put a compound fracture in the snoot of the long oiler, a crimp in the water tank spout, and freeze the spinal column of the engineer as the fireman yelled: "Hold 'er there, you crazy loon: are ye trying to kill everybody?" About twice in a while the hostler would forget the cylinder cocks and put her in the house, but if she did not have a cord of wood under her wheels she used to hook off doors or kick out brick. All the machinists at the place had ground in her throttle, and one had gone over dry pipe and connections. The best machinist in the place bet a $100 dog he could grind that throttle so it wouldn't leak, and he would have lost if a dog worth that much could have been found. He tried again, and made up his mind to grind in everything, from the mud-ring up. He elevated the dome cover, and Barney, his helper, who was no bigger than a piece of waste, wormed himself down among the braces and lay on his back on the flues while the machinist went to hunt a certain wrench. When he came back Barney said: "Mr. 'obbins, I want to h'ask you a poser: what is the hobject of this 'ere vent 'ole in the long pipe? Hits only about a 16th, but what good does hit do?" Barney had found a hole in the dry pipe caused by the breaking out of a small piece of iron where a chaplet had been used to hold the core in casting the pipe. A copper plug in the "vent" cured the leaky throttle.—*Locomotive Engineer.*

Strike at Los Angeles.

The conductors and brakemen of the switching trains in the yards of the Southern Pacific at Los Angeles struck for the second time last week, demanding that the yardmaster be given control of his force without interference from the superintendent, who, it appears, was believed to have discharged some of the men as punishment for their participation in the previous strike (May 4). The freight train brakemen joined the yardmen and there was some violence. Constables and detectives had to be called upon and guards were placed on all freight trains moved. The company, however, found little difficulty in securing new men to handle a large portion of the business, and the men surrendered within three days. It was said that only a few of them would be taken back.

The Louis Huller Concessions—Mexico.

The Departments of Public Works in Mexico announce the following modifications of concessions granted to Louis Hüller for railroads in the states of Sonora, Sinaloa and Chihuahua for 99 years. The route covered is from Guaymas, the end of the Sonora Railroad, southward to the port of Topolobampo. From Topolobampo, eastward by El Fuerte to Ciudad Guerrero or other point where it may join any of the railroads in the state of Chihuahua. And from Ciudad Guerrero, northward and east of the Sierra Madre to a point on the United States boundary line, which shall be acceptable to the Department of Public Works. In addition, branches are to be built from the first mentioned link to the Real del Alamos and to Agiabampo, which is the port of Alamos.

The first link mentioned above is covered by the McWoods concession, the successor to the Sinaloa & Durango, lately noticed in these columns, and that between Topolobampo and Ciudad Guerrero covers a portion of the line of the Texas, Topolobampo & Pacific, of which the Hon. William Windom is President, and A. R. Owen Chief Engineer.

The subsidy with the Hüller concession is at the rate of $8,000 per kilometre.

Construction shall commence within 15 months, and the main line shall be completed within 10 years, 15 being allowed for the completion of the branches.

The concession provides that in no case shall foreign merchandise imported over the road pay less freight than is charged Mexican merchandise, but all Mexican products carried 400 kilometres for exportation, shall have a rebate of 50 per cent. on the established rate.

Massachusetts Institute of Technology.

At the recent "Commencement" of this institution the degree of Bachelor of Science was given to 77 students. The class of '88 is said to have exceeded by 20 the largest heretofore graduated. Although the students came from 14 states and one foreign country (Japan), three-fourths of the class was from Massachusetts.

The "School of Mechanic Arts" is to be discontinued. This school was established in 1876 and has been essentially a high school with somewhat extended instruction in drawing and shop work. It has never been endowed and the fees have been $150 a year. In 1887-'88 it had some 40 students. It has been decided that the resources of the Institute can be more profitably employed in its proper work, but the corporation urges upon the School Board of Boston the necessity of establishing a high school for manual training similar to the schools which are in successful operation in St. Louis, Cincinnati, Toledo, Washington, and other cities.

They "Found" a Train.

A correspondent of a railroad paper, writing from a "road "Out West," throws cold water on the enthusiasm of the advertising department of the road in the following heartless manner. "This division has been noted for bad luck the past year. * * Conductors and engineers are constantly getting the G. B. The —— boys would not come over on this division to run, and would sooner take their time. So it was with two full crews of conductors and engineers the past week. Why would you not come, boys? Business never was better than at the present time, but the division is short of engineers and crews. Too many in shop for repairs, and the crews do not obey rules, but run by order signals, and too many meet on main track. Conductor Blank's pay was stopped very suddenly last Friday, on No. 19, this being his fourth day on passenger train. They found another train, but no side track to pass. So he and engineer are hunting a job. But life is short on the —— Division with the best of them."

An Old-Time Speed Recorder.

Mr. Porter King, the veteran engineer of the Boston & Albany, who has been running on that road 44 years, celebrated his golden wedding recently, and on that occasion gave some interesting reminiscences of his career. He was employed as a driver on the Mohawk & Hudson when horses were used as motive power, and filled similar positions on the Long Island road and between Jersey City and New Brunswick, N. J. On the latter road, when horses were abandoned, he commenced service on a locomotive. No person was ever run over or killed by Mr. King's engine until a few months ago. When engaged in driving stage, before the advent of railroads, he was employed on the line between Boston and Brattleboro, Vt. There was no telegraph then, and the drivers changed off at Barre, Mass. To keep the proper check on the time consumed in trips the driver on leaving Boston was provided with a watch which was locked up and could be opened only by the agent at Brattleboro. This "time detector" was handed over by each driver to the next, and at the final terminus revealed the number of hours that had been consumed on the journey. In case of delay the apportioning of the blame between the different men must have required a diplomat. Whether the drivers had, before the advent of the iron horse, invented any scheme to circumvent the tell-tale watch, Mr. King does not state.

RAILROAD GAZETTE

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EDITORIAL ANNCUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will not entertain no proposition to publish anything in this journal for pay.* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

On another page we give a table of new construction which supplements the table given last week. The total track laid this year, up to May 1, so far as we have been able to get information, is 1,342.5 miles. The entire lack of reliable figures for the same period last year prevents any useful comparison, but certain interesting facts appear. For instance, we find that the Southern states east of the Mississippi laid 37 per cent. of all the track laid in the first four months of 1888, while they laid but 14 per cent. of all new track in the year 1887. This is partly owing to the earlier opening of the working season in the South, and the percentage will probably diminish as the year advances. But it is no doubt partly owing to the further fact that the new roads of the South bear actually a greater proportion to the total work of new construction than they did last year, and it is a fair deduction that that total is smaller this year than it was last. It will be seen that the group of states including Arkansas, Missouri, Kansas, the Indian Territory and Texas, has built 20 per cent. of the new roads so far this year, or, including Colorado, 29 per cent. Last year the group built 39 per cent. of the total. The Pacific Coast states have so far built 15 per cent. of the whole. In the great belt from the lakes to the Pacific, in which was built in 1887 29 per cent of all the new road, work has hardly begun this year, and that region cannot possibly figure as largely in the final total, either absolutely or proportionately, as it did last year. The tables are not given as being complete, but the errors are almost entirely those of omission, and are probably not great.

Two weeks ago, in a discussion in these columns of one cause of the recognized defects of many chilled wheels actually in use, it was said that "perhaps it [the chilled wheel] will finally be superseded by a solid steel wheel." Of course a statement so general in terms is safe enough to make, for no one can say that a solid steel wheel will not be made so cheap in first cost, and of such undoubted quality as to strength and wear that it will replace chilled wheels. It was not intended, however, to make a merely vague and general suggestion, for it is to-day commercially possible to get a solid Bessemer steel wheel for four cents a pound, and such a wheel is now undergoing trial on half a dozen roads. We have no information of the results of these trials, which have been in progress some two to four months. We refer to the wheel made by the Pittsburgh Steel Casting Co., some account of which was given in the *Railroad Gazette* of March 2. The wheel is cast, and then the tread and flange are rolled, at a cherry-red heat, to insure perfect form. Some results of breaking tests were published in the article referred to. No record of mileage has been obtained, but the makers are confident of getting 200,000 to 300,000 miles without re-turning. Their confidence is based upon what they know of the wearing qualities of their steel, which are now recognized by many large consumers, and upon experience of similar wheels now in service under trucks in glass-works, and elsewhere, under trying conditions. Supposing a 550 lb. wheel of this material is used, at four cents a pound, it will cost $22, while a reasonably good chilled wheel cannot cost less than $10. If the wheel at $22 endures four to six times as long as one at $10, and is still available for re-turning and further wear, it is evidently a good deal cheaper as well as safer. If such a wheel is to be had it is highly desirable that the railroad companies should know it, and the sooner the better. The makers of the wheel in question will not only furnish wheels for testing, but they stand ready to take orders for wheels for service, in any quantities, at four cents. This being the case, there seems no very good reason for not trying a solid steel wheel. We are informed that the Fowler Steel Car Wheel Co., of Chicago, also has 50 wheels now in use and expects to have 80 running within a week. Their wheel is considerably more costly than the Hainsworth. The prices given are $64 for a 42-in. and $45 for a 33-in. wheel.

The strains on locomotive coupling rods form a fruitful subject for discussion. Many rods are doubtless broken owing to being improperly keyed up, and are therefore subjected to excessive strains due to improper length, and rods are also broken from the gradual development of small flaws under the heavy strains to which the rods are subjected. It is, however, now generally admitted that one great cause of failure, especially on passenger locomotives is due to the inertia and momentum of a rod which is constantly changing the direction of its motion through the air. Many maintain that a coupling rod should be treated as a revolving body, and that the strains are caused by centrifugal force. Without entering into any examination as to which of these views is right, it is sufficiently evident that the strain which breaks the rods of a passenger engine is a cross-breaking strain acting in a vertical direction, and that fracture can be effectually prevented by making the rod of a suitable cross section to resist a cross breaking strain. Rods of I section have been remarkably successful on the Pennsylvania and on other roads where they have been tried, and experience goes to prove that in fast passenger service an I section rod of moderate weight is less liable to fracture than a heavier rod of plain rectangular section. The use of large crank pins minimizes wear and renders it possible to use bushed ends, which once drilled true in a suitable double spindle vertical boring machine cannot get out of adjustment. The two most important sources of fracture are thus eliminated in a very cheap and simple manner. It may be objected that in milling or planing an I section rod a great deal of metal is wasted, but this objection can be overcome by adopting the practice of the Chicago, Burlington & Quincy, where the rods are forged to an I section by using suitable dies under the steam hammer.

There is now a fair prospect that a uniform coupler for continuous steam heating will be used on all the roads running Wagner cars in connection with the Vanderbilt system. As these roads extend from Cape Cod to the Blackhills of Dakota, a uniform coupler will soon be in use over a very extensive area. It is very natural that the necessity for a uniform steam coupler should be felt most acutely by the sleeping car companies, which run through, while ordinary passenger cars are rarely interchanged. There are now three couplers which have been extensively adopted on a large scale, the Gold, the McElroy and the Sewall. The two latter have been adopted, subject, however, to certain conditions, by systems of roads working in connection and interchanging passenger and sleeping cars. While the Vanderbilt system, with its New England connections, and the Grand Trunk have pronounced in favor of the Sewall coupler, the Erie, with the Lehigh Valley and Delaware & Hudson, have resolved for the present to fit their cars with the McElroy coupler. The Manhattan system, after trials on a large scale, have adopted the Gold coupler. The action of the latter road does not in any way effect the interchange of cars with other companies, and therefore the use of a steam heating coupler on the elevated railroads of New York does not in any way hinder the adoption of a uniform coupler on the majority of the railroads of the country. This selection of three different couplers may be taken as proving that there are, at any rate, three excellent couplers in the market, and it is to be hoped that the Master Car Builders' Association, which fairly represents the mechanical talent of the railroads of this country, will discuss the question and select one uniform steam heating coupler, and agree to recommend its use on all the roads represented in the Association. The general introduction of steam heating will thus be immensely facilitated, while the adoption of different methods of heating the cars will not be interfered with. Many cars are already running with the coupling of one system, the trap of another, and the system of piping, regulating, etc, of a third. It is fortunate, indeed, that in this case the adoption of a standard cannot be said in any way to either favor a monopoly or bar the way to future improvements.

One of the most important subjects to be brought before the Master Car-Builders' Association is the adoption of a standard axle for freight cars of 60,000 lbs. capacity. A considerable difference of opinion exists as to the proper proportions of the journal. The diameter of the axle in the centre and in the wheel, factors which regulate its strength, are easily determined, because a very small increase in diameter immensely increases the strength of an axle. But with the journal a small increase in length or diameter increases bearing surface to a very slight extent. Multiplying the length and diameter together, which for purposes of comparison is an easy and fair means of estimating the value of bearing surface, the present journal, 7 by 3½, may be said to have a bearing surface of 26¼ sq. in. Assuming that a 60,000-lb. car will weigh empty 50 per cent. more than the 40,000-lb. car built a few years ago, the load on each journal is increased 50 per cent., and if the same amount of bearing surface in proportion to the weight is to be given in the new journal, it should measure 10 by 4, or 9½ by 4½, or 9 by 4⅝, each of these dimensions giving about 39½ sq. in. of bearing surface. Many car-builders are, however, of the opinion that it would be better to make the new axle capable of being placed under a lighter car after it had run some mileage under the 60,000 lb. car. If made but little larger than the existing M. C. B. standard, the necessity of adopting a new standard journal box and brass would be avoided; but it becomes a question whether sufficient bearing surface would be provided. It is acknowledged that any journal made of a convenient size to run in the existing M. C. B. box would be somewhat more liable to heat, and would wear faster than the existing M. C. B. journal.

We have received numerous letters on this subject from Master Car Builders in different parts of the country and the opinions expressed vary considerably. One points out that a journal which is too small is liable to be overheated and rendered unfit for use under any car. Several consider an 8 × 4¼ journal sufficient, and on one road an 8 × 4 journal has given good results under 60,000-lb. cars.

As usual in questions of this sort, there is much to be said on both sides, though from a mechanical standpoint it would appear better, in view of the probable future increase in the weight of cars and the higher speeds rendered possible by the use of continuous brakes, to make the new axle so large and so strong that it will serve for many years to come as the standard axle of the country. The use of a large axle would involve new standards and greater first cost, but the wear of journals and brasses would be less, and the operations of railroads would be subject to fewer interruptions from hot boxes.

The Northwestern rate war has taken a somewhat startling turn. Mr. Hanley, of the Chicago, St. Paul & Kansas City, has announced to the Inter-state Commerce Commission that his company cannot continue to be bound by the short-haul clause in its efforts to meet the cut rates of other roads. In other words, it will hold that uncontrolled rate-cutting by a rival line creates a special set of circumstances and conditions.

This position will not go unchallenged either by the shippers or by the Commission. To admit it as sound would nullify the whole section in its most important bearings, and make it little more than a dead letter. But the attempt to challenge it will prove by no means easy. Whatever the Commission may decide on the subject, the matter will undoubtedly be brought before the courts for revision. This will be a critical point in the history of the Inter-state Commerce Commission. The case is important on account of its bearing on the future of the Inter-state Commerce law far more than from any immediate effect on the existing war of rates. The courts are face to face with a most unfortunate alternative. If they do not apply the act to this case, they make the law a dead letter. If they apply it, they encourage some of the most serious evils and abuses which our railroad history has shown. They will increase tenfold the powers of roads which were built to sell, to force their rivals to buy them out. If an existing line does at once a good local and through business, an unscrupulous rival can build a cheap competing line which will have every advantage. The sound road cannot lower its local rates without great loss; the other road, therefore, has a positive advantage in the very absence of local business. The second road can readily afford to lose $50,000 a week

by a policy which will entail upon its rival a loss of perhaps $200,000 a week on local business if it meets the cut, or will deprive it of a large part of its through business if it does not meet it. Such a process can have but one result—consolidation; and the road which has the least to lose can dictate the terms. The effect of a strict construction of the act in this instance would ultimately be to give positive encouragement to the building of cheap parallel lines. The absence of local business, instead of being a source of weakness in the contest, would be a source of strength. That the general purpose of the short-haul clause, with proper reservations, is a good one, we fully believe. But we also believe that the result would be dearly purchased by an interpretation of the law which should give the least to lose the most power and interest in forcing a war of rates. We never concealed our opinion that the prohibition of pools endangered the success of the short-haul clause, by preventing the effecting of joint arrangements with regard to through rates. The matter is now coming to a practical test.

The first move in the present cutting was ostensibly to meet the competition of water routes between New York and St. Paul. Through rates between these two points could be made low enough to get the traffic and still be within the fourth section; and to meet *water competition* would be tolerated by the Commission at even a lower point, judging by previous decisions. Between *Chicago* and St. Paul, however, there is no water competition. But in practical working the rate from Chicago must be in proportion to that from New York, for the reason that Chicago has got so firm a hold on the trade of the Northwest, that Northwestern merchants cannot at once be driven to buy in New York. The same conditions apply to a certain extent on east bound business. Meanwhile, Chicago lumber merchants are complaining because rates from the Wisconsin lumber district to Mississippi River and Missouri River points are so low that lumber goes direct instead of through Chicago. Some of the firms say that they must move to the vicinity of Eau Claire or Chippewa Falls or give up the business.

The first sign of positive distress as a result of the Northwestern rate war appears in the default of the Minneapolis & St. Louis on its interest payments. The bonds draw high rates, and the total amount of interest in default is $91,000. The net earnings for six months have been about $40,000 below the fixed charges. While it is in one sense proper that the bondholders should begin at once to assist in bearing the misfortunes common to all the Northwestern lines, it would seem that the Rock Island's interest in the road would have led it to grant assistance if it did not believe the situation to be very bad.

The sensational dispatch in the newspapers stating that the Chicago, Milwaukee & St. Paul had assessed all its employés a certain sum to defray the expenses of the company in the strike of switchmen at Chicago in April is not wholly without foundation after all. It seems that the order given to suspend a portion of the force when business was partially stopped in Chicago extended to distant (if not all) divisions of the road and included a reduction of the pay of men who remained on duty. It is stated that station agents in Iowa receiving $50 a month and less were "docked" 33⅓ per cent. for six days, and that the same rule was applied to officers' salaries. While stagnation of business certainly demands prompt measures, it would seem as though no one point (even as large as Chicago) on a 6,000-mile system could make a disturbance warranting such heroic treatment as is here indicated.

President Miller issued last week an order to heads of departments requiring strict retrenchment and the discharge of all employés not absolutely needed. He says:

"The business of our line was exceptionally heavy during the winter, and a large extra force of men was required to handle it. Now that the volume of business has fallen back to a normal status, that extra force must be dispensed with. Then again, rates, owing to the persistent endeavors of the railway commissioners of several states—notably Iowa and Minnesota—have a downward tendency that demoralizes earnings and reduces revenues, and expenses must be reduced accordingly in order to maintain the equilibrium."

Wages have not been ordered reduced, but Mr. Miller hints that they may be if earnings continue as low as they are now. Whether this circular is intended as a sort of preliminary warning to the lawmakers that restrictions on rates will re-act on the wages of railroad employés, is left for the reader to judge.

As every one knows, there is often much more skill and forethought required in running an accommodation train than an express. The latter makes quick time between distant points, but the work is uniform. An old officer, used to handling way trains which require close attention, recently remarked, concerning a certain "limited" train, that he "could roll a barrel of salt" to the train's destination in the time allowed it. With an accommodation making frequent stops, the conductor and brakemen have a share in the credit of successful running, while in the other case the engineer monopolizes it. A recent newspaper item refers to a train of the Pittsburgh, Cincinnati & St. Louis as the fastest accommodation in the country. It leaves Cincinnati at 5.30 p. m., and makes the run to Morrow, 37 miles, in one hour and sixteen minutes, including 14 stops. It is estimated that the stops take up 21 minutes, the actual running time thus being 55 minutes. As the size of the engine, number of cars, location of stations as regards ease of starting, and other factors are variable on different runs, it is hard to make exact comparisons between one performance and another; but we presume the writer of the item referred to is anxious to have some one come forward and claim to be able to beat this record.

The Effects of the Short-haul Clause.

We present, in this issue, a brief summary of the reports of the roads operated by the Newport News & Mississippi Valley Company. They furnish a good illustration of the effect of the Inter-state Commerce law upon the weaker railroad systems, to which attention was called in the Commissioners' report.

Although the Chesapeake & Ohio received less per ton-mile in 1887 than in 1886, its through freight earnings show a loss of 7½ per cent., contrasting strangely with the increase of through freight earnings by most other lines, and with the increase of local freight on the Chesapeake & Ohio itself.

"It is quite clear," say the Inter-state Commerce Commissioners in their report, "that the more powerful corporations of the country, controlling the largest traffic and operating on the chief lines of trade through the most thickly-settled districts, can conform to the statutory rule with much more ease and much less apparent danger of loss of income than can the weaker lines, whose business is comparatively light and perhaps admits of no dividends, and the pressure of whose fixed charges imposes a constant struggle to avoid bankruptcy."

It was not merely true that the stronger lines could thus conform to the short haul clause; they had to a very considerable extent done so before the act was passed. In spite of the many reductions given to large shipments of long-distance traffic, it is nevertheless true that the local shipper on the Pennsylvania or Vanderbilt lines was relatively better off in 1886 than he was ten or fifteen years before. He was far from standing on an absolute equality with his Chicago competitor, but the difference was growing less. The managers had learned that it was an unwise and short-sighted policy to give such rates as to stifle local traffic and simply build up a few competitive points. They had by no means the courage or the power to apply this lesson everywhere and at all times; but they were doing much better than they had done. A weak road, on the other hand, found itself unable to pursue a far-sighted policy in these matters. Hampered by the difficulty of meeting its interest charges, it was forced to make every effort to secure competitive traffic by special concessions, while on the other hand the necessities for present revenue made it hard for such a road to make reductions at local points whose good fruit might not be reaped for some years to come.

When the short-haul clause of the Inter-state Commerce law was supplied, the difference between the two classes of roads was at once manifest. The roads which had been charging high local rates were in difficulty. To lower these local rates to the level of the existing through rates would leave them no profit, but would involve doing the business at a loss. To raise the through rate, on the other hand, to the level of the local rate, would involve a sacrifice of all chance of doing through business of any kind. On the other hand, the stronger roads found certain advantages from the change. The adjustment was to them a comparatively easy matter. They could reduce their local rates without severe disaster; or they could raise their through rates to the required level without forcing through traffic to seek other means of reaching the market. In fact, if all roads were compelled to raise through rates to something like a common level, the strongest roads were the ones which had the most to gain and the least to lose.

On both classes of roads there was a tendency toward lower local rates and higher through rates; but on the weak roads the former result was most obvious, and on the stronger roads the latter. In comparing the annual reports for 1887 with those for 1886, we find on the weak roads lower average ton-mile rates, large gains on the local traffic and actual reduction in through freight earnings; while on the strong roads, we find, on the whole, higher ton-mile rates and considerable gains on through freight. So marked is this tendency in some cases that the Lake Shore for instance, shows at once a higher average ton-mile rate and longer average haul.

As a rule, the strongest road can afford to make the lowest local rates. Any law which insists that local rates shall be made a standard for through rates, and actually enforces this position, will benefit two classes in the community. First, the owners of the strong roads who are put in a relatively better position in competing for through traffic. Second, the local shippers on the weaker roads, who get the benefit of any forced reductions of rates. The people who suffer are, to some extent, the stockholders of the weaker roads thus handicapped in the competition; but most of all those local shippers who would be glad to have railroads built into their immediate neighborhood, but cannot afford to pay for them under the restrictions imposed by the Act.

Railroad Tax Systems.

The New Jersey tax law of 1884 provided for the separate valuation of the individual parts of the property of a railroad. Real estate not used for railroad purposes was assessed locally, like any other real estate. Then the State Board of Assessors were to estimate the value of the main stem, of other real estate used for railroad purposes, of tangible personal property and of the "franchise."

In the first annual report of the board the results of this procedure were given in detail. The work was, on the whole, remarkably well done. This is shown by the fact that, although these results have been challenged by the companies, and subjected to almost constant discussion in the courts, the aggregate changes have been very slight indeed. But while the total change has been slight, the change in the apportionment of individual items has been much larger; not through original errors of the tax commission so much as through real defects in the law itself. The method of valuation was defective; so much so that even when the general result was correct the details were almost necessarily wrong. The state authorities themselves would hardly admit this; but actions speak louder than words.

If we compare the assessments for 1887, as given in the advance sheets of the forthcoming report, with those for 1884, we find two main changes.

1. The main stem includes more, the separate pieces of railroad property less.

2. The distinction between main stem valuation and franchise valuation is being rapidly done away with.

The former is the result of decisions by the courts, the latter the result of the experience of the commission itself; but both were the almost inevitable outcome of an effort to make the law conform to the facts of modern business. A railroad is not, in point of fact, a collection of separate pieces of property. It is a vast centralized organization. The individual pieces of property, with but few exceptions, have their value as parts of that organism, not as separate objects. It is nothing but an absurdity to value track on the basis of surrounding meadows, or stations like ordinary warehouses. It is for their earning power that these are valuable, not for their own inherent qualities.

The old system of local assessment ignored this state of facts. Its theory—as far as it can be said to have had any theory—was that any excess of value of the business as a whole would be assessed against the stock or bondholders in taxing them upon the value of their securities. Of course, this proved a delusion. It was found impossible to reach such property; the most iron-clad oaths did not secure its disclosure. The only way was to tax the railroad as a whole, as distinct from the individual pieces of property on the one hand, or the individual owners on the other. This has been clearly recognized by all those who understand railroad taxation. The only dispute is as to the best method of valuation. Some states base their valuation on gross earnings—a convenient method, but unfair to the roads which do a large business at low rates, and which have large gross earnings, but comparatively small net earnings. Others base it on the net profits of the business, as measured by the amount of dividends declared, or, more commonly, by the market value of the securities.

The last is the fairest method, but its real nature is often misunderstood. Horace White, in his recent edition of Cossa on Taxation, understands the practical workings of the matter well, but falls into a mistake

in trying to explain them. A tax on the value of stock and debt is, he says, "really a mixing together of subjective and objective taxes." By an objective tax he means a tax on a tangible piece of property like a locomotive; by a subjective tax, a tax on a person or corporation because he is worth so much money. Now there is really no confusion in this case. The confusion is in Mr. White's interpretation of the facts. If you tax a corporation on its stock alone, then you have a subjective tax. You are taxing a particular set of rights to the property; not the property as a whole. But if you tax a corporation on the market value of stock *and* debt, you are taxing the property as a whole, and simply using the stock exchange valuation of its securities as furnishing, on the whole, by far the fairest means of estimating the true value of the whole. If you estimate the value of some of the rights to the property, and some of the individual pieces of property, you create confusion. But if you carefully ascertain the value of all the rights to the property you have the value of the property as a whole.

The trouble with the New Jersey law is that it really confuses the two methods. The best way would be to value all the rights; the next best, perhaps, to value property at what it is worth. To value the property for less than it is worth and call the rest of the value "franchise," involves all the difficulties of both systems combined. More than that, it keeps up a set of false traditions as to the nature of railroad values. Most people would define a franchise as the right to construct a railroad. In one sense this has no value at all; for under the laws of most states any one is free to construct a road after complying with a few simple conditions. It is true that if a railroad is judiciously constructed it is often worth much more than it cost. But this is not the value of the franchise. It is not due to a grant of rights, but to the successful exercise of business skill. A good railroad is worth more than it cost, for the same reason that a good factory or dwelling house is worth more than it cost. If any one were to try to assess a house by estimating the cost of the materials, and then adding the value of the right to live in it, it would involve an obvious absurdity. Yet this is what a great many men do the moment they try to assess a railroad for tax purposes.

Annual Reports.

Chesapeake & Ohio.—The results of the year's operations are as follows:

	1887.	1886.
Freight earnings	$3,504,420	$3,319,371
Passenger "	771,710	630,573
Other "	175,037	146,103
Total earnings	$4,451,168	$4,096,048
Operating expenses	3,152,170	2,867,981
Earnings over operating exps	$1,298,998	$1,228,066
Other receipts	7,081	11,626
Total	$1,306,079	$1,239,693
Taxes and rentals	110,878	109,227
Leaving	$1,195,201	$1,130,465

The increase in earnings is largely due to local freight. Through freight earnings in fact showed an actual decrease of 7½ per cent., due both to lower rates and its lessened volume of traffic. In the passenger business the increase was pretty evenly divided between local and through business.

	1887.	1886.
Average receipts per train mile, freight	$0.97	$0.92
" " " passengers	0 80	0.78
" per ton mile cts.	0.536	0.541
" per passenger mile	2.13	2.07

A detailed comparison of financial operations for successive years is hardly worth making, because the company three months before the close of the year passed from a condition of lease to one of receivership. The nominal deficit for nine months was $549,475. The extension of the lease to the close of the year would have reduced this result somewhat. It should also be observed that nearly $358,000 of this deficit is due to expenditures on capital account.

With a view to increasing the west-bound tonnage, and securing prompt and reliable transportation for the large export business seeking Newport News, arrangements were made at the beginning of the year for a direct line of steamships between Newport News and Liverpool. It was expected that, like similar enterprises, this line would for a time be run at a loss, but that in the near future it would become self-sustaining. The lessee's proportion of the loss therefrom during the year was $119,451.68, but the amount of this loss was diminishing monthly, as the line became better known.

Elizabethtown, Lexington & Big Sandy.—The results for 1887 show a gain over 1886:

	1887.	1886.
Freight earnings	$849,688	$731,872
Passenger earnings	232,524	176,155
Other earnings	32,861	29,501
Total	$1,115,073	$937,529
Operating expenses	706,219	609,908
Earnings over operating expenses	408,854	327,621
Other receipts of company	9,144	5,994
Total surplus	$417,999	$333,616

Against the above surplus is chargeable for taxes, interest, construction, etc., $324,699, leaving a net surplus above all charges of $93,300 for 1887, against $24,971 for 1886.

Of the increase in the operating expenses, more than half was due to maintenance of way, and much of the rest to repairs of equipment.

Chesapeake, Ohio & Southwestern.—Here also we find a decided gain.

	1887.	1886.
Gross earnings—Freight	$1,446,731	$1,242,242
" " Passenger	450,846	383,942
" " Total, incl. misc.	2,001,723	1,713,326
Operating expenses	1,191,856	1,061,384
Net earnings	809,867	651,942
Fixed charges	713,620	670,037
Surplus	96,247	18,095 deficit.

The average receipts per ton mile have fallen from 1.00 cent in 1886 to 0.895 cent in 1887. This is the more remarkable on account of the increased shipments of general merchandise, which amounted to 87,799 tons in 1887 against 35,580 tons in 1886; an increase of nearly 150 per cent. We also note, with some surprise, an increase in the passenger earnings from 68⅜ cents to 82½ cents per train-mile; indicating that the increased passenger traffic was carried with a substantially unchanged train service.

Kentucky Central Railway.—This road has been under its present management and conditions for too short a time to make any detailed comparisons possible. For the seven months and a half since the reorganization the company shows net earnings of $348,000, and surplus above fixed charges, of $125,000. Estimating on the basis of the whole year, this surplus would be $108,000.

An increase in freight earnings is quite remarkable, because the average rates per ton-mile fell from 1.657 cents in 1886 to 1.394 in 1887—a decrease of 16 per cent. The volume of freight traffic (ton mileage) increased 35 per cent., and the passenger mileage at the same time increased 23½ per cent. This being the case, it is much to the credit of the officials of the company that the increase in operating expenses is small.

Consumption of Fuel in Continuous Heating.

It is very generally conceded that the fuel consumption of a locomotive is not very perceptibly increased where continuous heating is in operation. When it is borne in mind that a substantial amount of fuel is used in the old-fashioned stove, the economy of continuous heating is somewhat surprising.

The annual report of the Pennsylvania for 1884 states (with reference to the Pennsylvania Railroad Division and branches only) that the expenses for fuel chargeable to the transportation of passengers only were as follows:

Fuel burnt in locomotives	$168,000
Heating cars	20,000
" stations	16,000

The cost of heating the cars was consequently $\frac{1}{8.4}$ of that of the fuel burnt on the passenger locomotives, and as stoves are in use only for five months in the year the cost of heating cars during the winter is about $\frac{1}{8.4} \times \frac{12}{5} = \frac{1}{3.5}$ of the cost of the fuel burnt on the locomotives. As the Pennsylvania passenger locomotives burnt in 1884 an average of 52 lbs. per train mile, the cost of heating the cars was equivalent to the cost of $\frac{5.2}{3.5} = 14.8$ lbs of coal per train mile.

The item "heating cars" includes not only the cost of fuel but the repairs and renewals of stoves and pipes, coal boxes, stove fenders, ventilators and rings for stove pipe, steam pipe and cost of fixing, and fuel for Pullman palace cars from clearing house balances due other roads.

If, however, the cost of fuel formed only one-third of this item, it is probable that continuous heating would effect a considerable economy in the cost of heating cars, because experience so far appears to show that 1 lb. of fuel burnt on the locomotive is more effective with continuous heating than 3 lbs. burnt in a stove, and if these proportions are tolerably correct, the saving by continuous heating should be equal to the cost of about 3 lbs. of fuel per mile. These figures are based on the assumption that the hose, couplings and pipes will cost no more to repair than stoves and their accessories. On some roads where continuous heating has been used for some time on an extensive scale, it is believed that the repairs are less costly than with stoves, while it must be generally conceded that the time and attention needed in firing stoves and the dirt and damage caused by coal and smoke are entirely saved by the adoption of continuous heating. As, however, these items cannot be charged directly against the cost of heating cars, the saving, though real, cannot be expressed in figures.

Any really trustworthy figures on the subject can only be obtained when the continuous principle of heating cars is more largely used than at present and has passed completely out of the experimental stage, but the results obtained so far appear to warrant the belief that in point of cost of maintenance continuous steam-heating compares very favorably with stoves.

Working Steep Grades in India.

It was announced some time ago that the Abt system of stepped rack rail was to be used on one of the lines crossing the spurs of the Himalayas on the route to Candahar, the grade being 1 in 25, or 211 ft. per mile, but *Indian Engineering* states that "during the past week there has been a trial of the Abt system on the two miles of line which have been completed. The system did not stand the tests satisfactorily; and it is not unlikely that the idea of having the Abt system from Mach to the Katal will be entirely given up. The Abt system does not work well on curves, and the engines can only climb hills provided that their heads are kept straight. Perhaps the engines and materials collected at Hirok will be utilized at the Kojak."

A commission was sent out by the Indian government last year to examine the methods employed in working steep inclines in this and other countries, and after an examination of the Fairlie system as used on the Mexican railway, reported strongly in favor of the Fairlie engine, the conclusion of the Commission being that it could haul a train fully 50 per cent. heavier than that taken by an ordinary Consolidation engine, while the speed was also somewhat greater. This is, of course, the result of the greater adhesive weight and tractive power of the Fairlie, which has twelve driving wheels and four cylinders. The great tractive power of the Fairlie engine has always been unquestioned, but it has generally been considered that the extra complication and the moving steam pipe joints and other special features of the engine were objectionable. This, however, was stated on examination not to be the case, and the report stated that all the defects which the Fairlie engines used on the Mexican line showed in practice were due to small defects which had nothing to do with the principle of the Fairlie engine and could be easily remedied. The difficulty with leakage from the ball and socket joint in the steam pipes was found to be caused by the runners screwing the joints too closely together, so that they cut and leaked. This trouble has been overcome in a totally novel manner. A lead washer 1½ in. thick is placed under the nut. If the nut is screwed up too tight, the lead washer simply squeezes out, the pressure on the joint remaining practically unaltered.

The stock already used for working the Bolan pass in the Himalayas is very heavy, but the exigencies of a long grade of 211 ft. per mile demand even heavier engines than the ten-wheeled tank engines now running, which weigh 146,000 lbs. in working order. The Indian gauge of 5 ft. 6 in. gives ample facilities for capacious rolling stock, and the passenger cars are 72 ft. long. The freight wagons are chiefly four wheeled, but they carry 31,000 lbs. and weigh 17,000 lbs. empty, giving a somewhat greater load per axle than our 60,000-lb. car. The journals, however, are of ample size, 9 in. by 4¾ in., and we are informed that they very rarely run hot or cut, and that the general adoption of this large journal over the Northwestern railroad system of India has proved a most judicious step, the results being very satisfactory.

The permanent way is also exceptionally strong and heavy, the rails weighing 98 lbs. per yard, and thus exceeding in weight any rails except Mr. Sandberg's Goliath 100-lb. rail and those used on the Belgian state railways. All these rails are of the flanged or flat footed or Vignoles pattern, as it is variously termed. Steel cross-ties are employed in the Bolan.

Railroad Accidents in Great Britain.

The British Board of Trade Returns of railroad accidents is in many respects a remarkable document, as it shows tolerably accurately how great a degree of safety has been attained in the working of railroads in a country which is indisputably first in the use of safety appliances, both in the working and construction of railroads. The degree of perfection attained is shown by the facts that during the last five years only four accidents, two collisions and two derailments, have been attended with serious loss of life, from 6 to 24 persons having been killed in each accident. Practically, therefore, less than one really serious train accident occurs annually. Last year one serious accident (that at Hexthorpe) killed 24 out of the 25 passengers killed during the year by accidents to trains, permanent way, etc. The value of the block system could not be better emphasized than by the fact that its temporary suspension, and reversion to a more elastic but less safe method of working, congested traffic and caused 96 per cent. of the preventable passenger death roll.

An examination of the figures given very fully below shows that while the difficult task of running trains at high speed along crowded lines has been accomplished with few derailments and collisions and a remarkably small list of killed and injured, the relatively easy task of providing safe methods of handling freight and passengers at station, has been far less successful. Four times as many employés were killed, and 3,700 were injured in mishaps other than train accidents.

As the precautions for safety taken at English railroad stations are in excess of those considered sufficient in most other countries, the question arises whether the largest proportion of persons killed and injured on railroads do not suffer from causes that are simple, really unconnected with the working of railroads, and capable of being largely diminished by the use of ordinary precautions.

English railroads have improved their permanent way, strengthened their rolling stock and generally adopted interlocking, the block system, and last, not least, continuous brakes, with the remarkable result that train accidents have only resulted in the death of 33 passengers and employés, and the injury of 647 persons during a year's working.

These figures may seem large and are above the average for several years past, but appear small when contrasted with the death roll caused by accidents where improved appliances have not been so freely used or have not been so effective. The number of employés who were killed (run over) whilst working on the permanent way was 99, while 93 employés were struck and killed by trains whilst walking, crossing or standing on the line on duty, and 37 more were killed whilst walking along the line on their way home or to work. Briefly, whilst only 8 employés were killed by accidents to moving trains, 229 were killed whilst working, standing, or walking near the track as shown in the table. The lesson to be drawn from these figures appears to be that

the best known precautions do prevent disastrous collisions or derailments, but that the greater proportion of the deaths take place from causes that can better be guarded against by individual caution than by mechanical appliances.

The deaths amongst other persons, not railroad employés, whilst walking along or crossing the line, including suicides, was no less than 336, and the number of persons who were killed whilst crossing the railroad at highway crossings was more than double those killed in train accidents.

The operation of coupling does not appear to be as fatal as it is at present in this country; but 26 deaths and 232 injuries are recorded as having occurred whilst coupling or uncoupling cars.

TABLE NO 1

Accidents to Trains, Rolling Stock, Permanent Way, etc., in the United Kingdom during the year 1887.

	Cases	Passengers and others.		Employés.	
		K.	I.	K	I.
Collisions, passenger trains or parts of	31	25	244	..	14
Collisions, passenger trains and freights	42	..	187	1	47
Collisions, freight trains or parts of	16	..	6	2	24
Trains fouling projections from trains on parallel tracks	2	..	6	..	..
Derailments, passenger trains or parts of	49	..	20	1	10
Derailments, freight trains or parts of	9	..	..	3	1
Trains or engines running on wrong line through switches	2	..	..	..	1
Trains entering stations too fast	23	..	52	1	5
Running over cattle, etc	116	..	..	..	3
Running through highway crossing gates	47	..	..	..	..
Burst boiler or flues, locomotives	1	..	..	..	..
Failure machinery, springs, etc., locomotives	4	..	..	..	2
Failure tires, locomotives and rolling stock	767	..	..	..	..
Failure wheels, locomotives and rolling stock	....	..	..	..	..
Failure axles, locomotives and rolling stock	281	..	..	..	..
Failure brake rigging, locomotives and rolling stock	1	..	15	..	..
Failure couplings, locomotives and rolling stock	3	..	1	..	1
Failure ropes for inclined planes	1	..	..	..	..
Failure tunnels, bridges, culverts, viaducts	2	..	..	..	..
Broken rails	244	..	..	..	..
Flooding of permanent way	8	..	..	..	..
Slips in cuttings or embankments	5	..	1	..	1
Fire in trains	8	..	..	..	..
Fire at stations, bridges, etc	9	..	..	..	..
Other accidents	2	..	6	..	..
Total	..	25	538	8	109

In addition to the above accidents incident to the course of public traffic, the following accidents also occurred on railroad premises, though unconnected with the movement of rolling-stock:

TABLE NO. 2.

Number of persons killed and injured on the railways of Great Britain and Ireland, year 1887.

	Passengers.		Employes.		Others.	
	K.	I.	K.	I.	K.	I.
Accidents to trains, rolling-stock, permanent way, etc.	25	538	8	109	....	....
Other causes, including accidents from their own want of caution or misconduct	96	759	414	1,966	....	....
At highway crossings	....	....	....	....	63	35
Walking along track	....	....	....	....	203	114
Suicides	....	....	....	....	70	....
Miscellaneous, not included above	....	....	....	....	40	69
Total	121	1,297	422	2,075	376	218

TABLE NO. 3.

	K.	I.
Ascending or descending steps at stations	3	139
Struck by barrows, falling over packages on station platforms, etc	..	36
Falling off platforms at stations	..	48
Other causes	2	71
Total passengers	5	294
Loading and unloading cars	3	979
Handling freight in warehouses	2	292
Working cranes or capstans	3	162
Fall of car doors, lamps, bales, etc	2	363
Boarding and leaving standing engines and cars	3	404
Falling off platforms, ladders, scaffolds, etc	7	292
Stumbling while walking on line or platforms	2	225
Attending stationary engines	..	190
Trampled on or kicked by horses	1	50
Working on line or in sidings	8	490
Various other causes	3	256
Total employés	34	3,703
Other persons	19	160

Thus the total number of personal accidents reported to the Board of Trade by the railroad companies amounted to 977 persons killed and 7,747 injured.

An important step has been taken towards the adoption of a uniform coupler for steam heating. The Wagner Sleeping Car Co. recently requested the roads running Wagner cars in connection with the Vanderbilt system to come to some agreement as to the form of steam heating coupler to be used on all the connecting roads. A meeting of representatives of these roads was held at the Grand Central Depot on the 29th ult., but adjourned without coming to any definite agreement. Another meeting was held on the 6th inst., the following gentlemen representing the connecting roads. The figures following the names of the roads give the total number of passenger cars, including baggage, mail and express, according to the latest returns:

F. D. Adams, Boston & Albany, 287.

J. N. Lauder, Old Colony, 311.

John Adams (Gen. Supt.) and J. D. Marden, Fitchburg, 160.

Horace G. Young (Gen. Manager) and R. D. Blackall, Delaware & Hudson, 218.

J. D. McIlvain, Grand Trunk, 770.

J. M. Toucey and W. Buchanan, New York Central, 940.

E. Gallup, Lake Shore & Michigan Southern, 297.

J. D. Layng, West Shore (cars included in N. Y. C.) and Cleveland & Columbus, Cincinnati & Indianapolis, 110.

Robert Miller, Michigan Central, 280.

G. W. Tilton, Chicago & Northwestern, 485.

After some discussion, it was decided that the representatives of the Delaware & Hudson and Chicago & Northwestern roads could not be permitted to vote. The voting it was agreed should be by cars, each passenger car to count as one vote.

The three couplers proposed for selection were the Martin, McElroy and Sewall, and the final ballot showed that the latter form of coupler had received the majority of votes, having 1,980 votes, against 1,867 for the Martin It was therefore decided, subject to the approval of the executive officers of the respective companies, that the Sewall coupler for continuous steam heating shall be adopted on all roads running Wagner cars in connection with the New York Central system. It is also stated that the Chicago & Northwestern prefers this form of coupler.

It is understood that this choice of a coupler does not interfere with the use of any system of heating inside the car, and that there will be no obstacle raised to prevent the adopted coupler being used in connection with the Martin, McElroy or any other system of heating.

It is too late in the century to discuss the relative advantages of position signals and color signals. It is not many years ago that this was a subject of debate, but to-day every one who knows or cares much about signals recognizes the great advantages of the simple and positive semaphore. The practical difficulty is to make it useful at night. Some time since there was shown in the *Railroad Gazette* an illuminated semaphore blade, made by the Union Switch & Signal Co. Some doubt was expressed at that time as to whether the signal would be seen at a sufficient distance at night. We have lately seen four of these semaphores in a position where they are amongst and projected against the lights of a city. It was at once evident that in any given condition of the atmosphere the blade so lighted can be seen quite as far as it can be distinguished by day. But what is of still greater importance, the light is of such a peculiar and characteristic form that it cannot possibly be confounded with any other light. Red lights may be used for other purposes than railroad signaling, or, as has lately happened, a half-drunken boy may shoot at and smash a red lens, but a bar of white light 32 in. long and 2½ in. wide is unmistakable. Furthermore, breaking the glass will not affect the signal unless the lamp is broken or blown out, and it is so well protected by the post and fixtures that either of these accidents is improbable. On the whole the signal is a beautiful one, and it is difficult to see any good objection to it, except possibly its cost.

A bronze statue of the late Thomas J. Potter is proposed among his friends, and a commission has been formed at Burlington to further the project, as will be seen by the circular printed in another column. This proposal is unique. There have been numerous railroad officers who have been honored and loved to a very marked degree, and imposing shafts of marble and granite have been erected to their memory, but a statue we do not recollect to have heard mentioned before. The figure of George Stephenson adorns the St. Pancras station of the Midland Railway in London, but Stephenson was not merely a railroad man; he made a new era in the world's history. But why should not railroad managers be honored? The pre-eminent importance of their profession among our material interests is a matter of common remark, and the influence of these interests on social and moral conditions is too great to be measured. And there has been a decided change from the times when railroad presidents were mere financiers and their under officers were picked up where they could be found. It is now recognized by the great body of wise stockholders that there is a distinct railroad profession, and that only those well trained in it are fit to administer the affairs of even a road of moderate importance. Mr. Potter was essentially a technical railroad man, albe it his education was chiefly acquired in the characteristic American school of experience. His reputation was made on a great railroad, where he could not deal with his thousands of subordinates directly, and yet it appears that an important factor in that reputation was his ability to hold the friendship and loyalty of those subordinates. He appears to have succeeded in convincing the owners, the patrons and the employés of the roads he served that he was fair and just to each of these classes. This is no small achievement, and it should afford ample stimulus to the rising generation.

The Chicago roads have taken an important step in the improvement of the morale of their yard men by adopting a rule to do as little switching on Sunday as possible. Several of the prominent roads have agreed to suspend the handling of "dead" freight between 6 a. m. Sunday and the same hour of Monday. To give the men a day of rest is only simple justice, and the widespread practice of doing so much work on Sunday as is now done is an evidence of laxity in management. Most shippers and consignees work only six days out of seven, and the railroads ought to be able to keep up with them. Whether this new day of rest shall be employed in real recreation or only in that which is imaginary or fictitious depends upon the trainmen themselves.

A very ingenious friction buffer has been devised by Mr. George Westinghouse, Jr., and is now to be seen applied to the Janney coupler on several cars. No new springs are introduced in the draw gear, but the work of the buffer, as such, is done entirely by friction. It is not thought desirable to publish any description of the device at present, but railroad men are invited to examine it.

A system of heating by steam from the locomotive, complete in all its details, with its own coupler, has been designed and built by the Standard Car Heating & Ventilating Co., of Pittsburgh. The system has been run on a train in regular service for four or five months, and is said to have been found entirely satisfactory. The company has hitherto thought it wiser not to enter into competition for orders in the somewhat undeveloped state of the art of continuous train heating, but we understand that it is now ready to take the field. Complete circulation is provided for in this system by a return pipe to the tender, and the water of condensation is discharged by an ejector.

The Massachusetts Legislature has provided for the publication of a Digest of the Decisions of the Railroad Commissioners of that state, and the volume, prepared by J. H. Wigmore, of Boston, is soon to be issued. The commission was instituted in 1869, and has stood at the front of bodies of the kind in this country, not only being the pioneer, practically, but also being distinguished by having Charles Francis Adams at its head for ten years. Mr. Adams' successors have also been able men. The utterances of the board since the incumbency of the present chairman, who had had no special training training for the work, indicate that he has marked aptitude for the place; and, as many of the decisions of the board have the force of law, the forthcoming volume will be a valuable work of reference.

The question of transporting ships from one point to another by rail has often been mooted, and recently the French Ministry of Marine made an experiment to ascertain whether vessels of moderate size might, in case, say, of a blockade, be transported by rail from the north of France to the Mediterranean. A torpedo-boat was successfully taken by rail from Cherbourg to Toulon. The boat was 111 ft. long, 11 ft. diameter, and weighed 38 tons. It was placed in specially constructed movable stocks on ordinary freight cars or wagons, and the whole journey—850 miles—was accomplished in four days and three nights, without the thin hull being damaged in the least. The speed of the train varied from 9 to 24 miles an hour, and twenty-four hours after the arrival at Toulon the boat was ready to go to sea. The cost was considerable, $2,750 for freight, and $6,500 for fitting the cars. This excessive cost was probably due to the fact that a boat 11 ft. wide could not be safely transported without blocking both tracks of a double track road, and that the length of 111 ft. would necessitate great care in passing over sharp curves, as the versed sine of such a long body would be considerable. These difficulties would not, of course, exist on a specially constructed ship railroad, and the fact that such a light and fragile hull as a torpedo boat was transported uninjured, is certainly favorable to the success of Capt. Eads' ship railroad.

The Inter-state Commerce Commission has issued a circular to all carriers engaged in inter-state commerce, calling their attention to the law authorizing the Commission to require annual reports, and informing them that the Commission will furnish the necessary blanks. The Commission also requests each road to forward a copy of its annual report for any period terminating in 1887, and also any other report issued since.

The new Reading four per cent. bonds were all subscribed for within two hours after the opening of the books in this city and Philadelphia. It is said that in that time the subscriptions here amounted to much more than the whole amount offered in New York and London. The books were closed in London at the end of the first day.

The international exhibition now being held in Glasgow appears to be remarkably successful, the attendance, 36,000 a day, exceeding that at the recent Indian colonial exhibition held in London, or the Manchester and Edinburgh expositions. The display of machinery generally is described as very fine; but singularly enough no locomotives are exhibited, though five large locomotive building works are situated in Glasgow.

NEW PUBLICATIONS.

Tables of the Properties of Saturated Steam and Other Vapors. By Cecil H. Peabody, B. S. New York: John Wiley & Sons, 1888. 8 vo. pp. 35. Price, $1.

These tables give the properties of saturated steam,

First. For temperatures on the Fahrenheit scale, from 32 deg. to 428 deg., varying by degrees;

Second. For pressures in pounds per square inch, from 1 to 336, varying by pounds;

Third. For temperatures on the Centigrade scale, in French units, from 0 deg. to 220 deg., varying by degrees.

There are also other tables giving, in French units, for intervals of 10 degrees Centigrade, the properties of the saturated vapors of ether, alcohol, chloroform, carbon bisulphide, carbon tetrachloride, aceton, sulphur dioxide and ammonia, together with tables showing the specific gravity of these liquids, and the relative volume of water at different temperatures on the Centigrade scale. The tables of the properties of saturated steam contain one column not usually given in steam tables, showing the "Entropy of the liquid," or a factor depending upon the changed volume and temperature of the liquid.

The tables are arranged conveniently for interpolation,

the differences between successive quantities being printed in several columns.

An introductory statement gives the formulas and constants used in calculating the tables. Regnault's experimental results are used as a basis, but Regnault's formulas are modified to some extent. The specific volume and weight of the vapor are calculated by the general principles of thermo-dynamics, using the number 778 instead of 772 for the mechanical equivalent of heat; and for the specific heat of the liquid Professor Rowland's constants are employed, assuming that a British thermal unit is the quantity of heat required to increase the temperature of one pound of pure water from 62 deg. to 63 deg Fahrenheit. These modifications of course change the final results, and the reader may be interested in knowing to what extent Professor Peabody's tables differ from those in general use. The comparison given below shows that the differences are not important, except in the weight of the steam. In this comparative table it will be seen that three numbers are given for each item, at the different pressures. In each case the first number is taken from Professor Peabody's tables; the second number shows Regnault's results as reduced to English measures by Mr. Charles T. Porter, the weight of the steam being calculated by Messrs. Fairbairn and Tate's formula; and the third number is taken from Regnault's tables, as corrected by the rules and formulas in Professor Rankine's treatise on the steam engine. With regard to the weight of steam, as determined by these latter formulas, Professor Rankine remarks: "The data from which the densities and volumes in these tables were calculated were the experiments of M. Regnault, on the heat transferred from a boiler to a condenser, by sending from the former to the latter known weights of steam under different pressures; and it is certain that whatsoever may prove to be the law connecting the density, pressure and temperature of steam under other circumstances, the densities and volumes in these tables cannot err to an extent appreciable in practice for steam obtained *under circumstances similar to those of M. Regnault's experiments*, which experiments are, in all important points, similar to those under which steam is obtained in ordinary steam engines." It may be added that the results contained in these tables agree so well with the results of practical tests that the weights and volumes given in Prof. Peabody's tables should be used with caution by practical engineers.

Comparison of Prominent Steam Tables.

Absolute pressure, pounds per square inch.	Temperature, Fahrenheit	British thermal units per pound.		Weight per cu. ft. Lb.
		In water above 32° Fahr.	In steam (latent heat).	
1	101°.990	70.000	1.045.9000	00299
	102° 000	70.056	1 042 9640	.003000
	10 °.018	70 140	1 043.0150	.003027
15	213° 030	181 830	965.1300	.038 60
	2 3° 025	181 999	964 9730	.038700
	213°.067	181 608	965 3180	.038688
30	2 0° 270	219.4 00	338.9000	.074600
	250° 2 5	219 738	938.9 50	.0 7 500
	2 0°.533	219 261	939.0190	.074 9 1
100	32 °.580	297 900	8e4.0000	.227100
	327° 571	298 935	882.9144	.233020
	327° 625	298 093	883.7730	.230 93
150	358°.269	330 000	861.2000	.359100
	3.8° 161	330.559	860.8213	.3 4000
	358° 243	329.566	861.6 40	.357643

TECHNICAL.

Continuous Brakes in England.

During the six months ending Dec. 31, 1887, the mileage run with the various kinds of continuous brakes in use in England was as follows:

	Train miles	No. failures and delays.
Westinghouse Automatic:		
Great Eastern	4 785.559	205
London, Brighton & South Coast	3.359.942	17
North Eastern	5.3 6 945	101
Caledonian	2.772 593	40
North British	2 698.047	31
Eleven other lines	2,061,648	94
Total	21 004.734	488
Automatic Vacuum:		
Great Western	6 885,136	75
Midland	6,6 1,5 1	23
London & Southwestern	2.934,106	46
Lancashire & Yorkshire	4.3 2.9 9	44
Seventeen other lines	1.770.318	46
Total	22 610,089	234
Simple Vacuum:		
Great Northern	4.491 499	67
London & Northwestern	7.871,855	41
Manchester Sheffield & Lincoln	1,7 9 0.7	10
South Eastern	1 849 083	10
Great Northern (Ireland)	972.649	0
Great Southern & Western	917,16	0
Metropolitan	999,209	5
Eleven other lines	2,755,949	9
Total	21 456,564	135
Clarks & Webb's (chain):		
North London	598 261	3
London & Northwestern	1,602,113	2
Total	2,559.296	5
Westinghouse Non-automatic:		
Metropolitan District	754,962	0
Summary:		
Automatic, all kinds	43 614,823	72
Non-automatic, all kinds	24,749.422	140
	68.363.245	862

The figures show, as might be expected, that automatic brakes are more liable to cause delay than non-automatic brakes, but it is evident that the security given by automatic brakes more than offsets the greater number of cases of trains stopped by faulty hose valves, etc., for many English roads are changing their simple vacuum brakes to automatic, and the London, Chatham & Dover, the line that hitherto has been most backward in equipping its cars with any continuous brake, has recently adopted the Westinghouse automatic. Most of the failures of automatic brakes were due to failures of hose, while many of the failures of simple brakes appear to have been due to failures of mechanism, which impaired the stopping power of the brake and rendered it incapable of stopping the train at the proper point.

Snow in the Gothard.

The engineer-in-chief of the Gothard Railway gives some interesting details of the fall of an avalanche during the past winter, which blocked up this line and, at the same time, caused the death of five workmen. The catastrope occurred on Feb. 15, after a prolonged fall of snow, which covered the ground to a greater depth than in any winter since that that of 1874-5. About three o'clock in the day an avalanche had fallen directly in front of the southern entrance to the covered way near Wasen, blocking it up, much of the snow being forced inside the gallery by the pressure of the wind. Six workmen were immediately sent from Wasen to clear the line, but they had been thus employed for not more than half an hour before a fresh avalanche rushed down, this time blocking up the northern entrance. This new avalanche was of colossal proportions, the like of which, it is stated, had not occurred within the experience of the oldest inhabitants in the district. Its fall caused a tremendous displacement of air, which, aided by the north wind, rushed up the gallery, throwing the six workmen to the ground, and forcing immense quantities of snow up the shed, which instantly covered the unfortunate men to a depth of several feet. The snow, it is stated, was forced up the gallery for a distance of 50 ft., and was so compact that it was necessary to use pick axes in removing it, while the débris from the avalanche extended nearly 350 ft. further. Under these conditions there was but little hope of finding any of the workmen alive, but nevertheless, the rescuing party succeeded in finding one of them still breathing, though the other five were all dead. The facts here set forth may appear extraordinary, but the mass of air displaced by an avalanche raises a perfect tornado, which is capable of demolishing the strongest buildings, and of breaking off at their base trees upwards of 3 ft. in diameter and transporting them considerable distances. It is stated that the increased severity of the avalanches in this district is due to the gradual deforesting of the hill slopes, previous to which they were few in number and of but little importance when they did occur.—*Engineering.*

Car-box Lubrication.

The Dreher Manufacturing Company, of No 37 Platt street, New York, have been supplying the "Dreher Lubricant" to the Pennsylvania Railroad for use on its vestibule and other fast trains for nearly a year past. The Erie, Grand Trunk, Lehigh Valley, Canadian Pacific and many other roads are also reported to have made satisfactory use of it. It is a patent grease, its form enabling the boxes to be packed full to the top, covering and protecting the journal and saving much time in packing. Eight brasses of a test coach were found to have lost only two ounces in weight during eleven months' service. The company undertake to prevent hot boxes, and offer a guarantee that "the average life of each packing of the grease in service shall be not less than 10,000 miles per packing," although they have made tests as high as 20,000 miles.

Heating Cars by Gas.

A somewhat singular manner of heating cars is being tried on a Scotch road, the Glasgow & Southwestern. The waste heat of the gas jet used primarily for lighting the cars is utilized for heating purposes. The method adopted is the invention of Mr. Foulis, gas engineer to the corporation of Glasgow. The main feature of the invention is the placing of a small boiler above the lamp, which is fixed in the usual way in the roof of the car. The water in this boiler is made to circulate by means of an arrangement of valves through pipes placed under the seats. This system would certainly appear to be quite insufficient in a cold climate, but might prove efficient where the nights are cool, though artificial heat is rarely needed during the day.

Artesian Wells for Railroads.

The Denver & Rio Grande Western is sinking artesian wells to supply the water tanks along the line. Farmington, Woods Cross, Francklyn and Battle Creek tanks are each supplied with splendid artesian water, saving the expense of pumping as in the past. Each of these wells cost $40, under contract, to drive, the company furnishing the piping, and each are about 200 ft. deep. The early wells put down in the deserts both east and west of Green River did not strike good water, and it is believed they did not go deep enough.

The Central of Georgia have also lately sunk numerous artesian wells, and now use this water, which is bright, clear and palatable, in preference to the swamp water formerly used.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Kentucky the Federal Court holds that the Act of Congress of July 14, 1870, relating to the taxation of railroad bonds, was part of the general system of income taxation, and fixed a time when that system should expire; and, in taxing the interest on such bonds as part of the corporate earnings, it applies only to interest actually paid, not to interest merely payable. Where two railroad companies consolidate, one assuming the debts of the other, this is a payment of such debts, as between such corporations, but is presumably not a payment from the "earnings" of the debtor, within the meaning of those internal revenue laws which provide for taxing corporate incomes.[1]

In Mississippi the Federal Court holds that the section of the state code (Sec. 1 083), which provides that no mortgage of the income, future earnings or the rolling stock of a railroad corporation shall be valid against debts contracted in carrying on the business of a corporation, etc., does not give a prior lien to the holders of such claims, but merely prevents those claiming a prior lien under such mortgage from setting it up to defeat such claims. In this case a railroad corporation, whose property was heavily mortgaged, made arrangements to operate its road in connection with other roads. The management of these roads was under the same general officers, although the business of each was kept separate. Sums were loaned by the corporations controlling the connecting lines to enable the indebted railroad corporation to pay its taxes, to pay its employés and to pay balances due themselves. The Court rules that these loans were debts contracted in carrying on the business of the corporation, within the provisions of section 1,083. The Court likewise lays it down that where current debts are incurred by a railroad company in the operation of its current business, they are chargeable upon the current income, as against holders of mortgage bonds of such railroad, whether they accrued before or after the railroad went into the hands of a receiver, and the fact that such debts were incurred for betterments does not affect the right to have them paid out of the current income, when the proofs show such betterments to have been necessary.[2]

In Virginia the Supreme Court of Appeals decides that a railroad chartered under the laws of Virginia, cannot, by the voluntary surrender of the possession, control and operation of its road, by deed of trust to trustees of its own selection, shift the responsibilities imposed upon it by law; nor relieve itself from liability for wrongs or injuries subsequently done to persons or to property in the negligent operation of its road.[3] In South Carolina the Supreme Court rules that a railroad corporation is not relieved from the obligations imposed by its charter by a lease of its road to another company.[4]

In the same state the same Court holds that under the statute providing that notice shall be given to the owner that a right of way for a railroad is required, and for his consent thereto, the consent of a life-tenant in possession will pass the right of way as against the remainder men; the railroad company holding by force of its charter, and not of the owner's deed. Also that under the statute providing that the fee shall remain in the owner, etc., a railroad corporation can claim only an easement in its road-bed.[5]

In Kansas, the Supreme Court decides that where a railroad company, incorporated under the laws of another state, regularly runs its passenger trains into and out of a county of this state, receiving passengers at a union depot in the county for transportation over its road; and landing its passenger from its cars at such depot; and has operating arrangements to run its passenger cars over the tracks of other corporations in the county to and from such union depot, an action may be brought against the railroad company in the county of this state where it runs its trains and receives and lands its passengers, for any injury to persons or property upon its road.[6]

Carriage of Goods and Injuries to Property.

In Massachusetts the Supreme Judicial Court decides that a carrier delivering goods received by him to a connecting carrier must give the latter all the instructions which he may have received from the shipper, and where the bill of lading provides that the goods are to be delivered at a certain place to the shippers or their assigns, on payment of freight and charges, a contract of the carriers to forward the goods to some other place cannot be implied from marks and directions on the bill indicating that the shipper intended some other ultimate destination.[7]

In Pennsylvania the Supreme Court holds that where goods are accepted by a railroad for transportation over its own and connecting lines, and on their arrival at their destination they are discovered to be damaged, there arises a presumption of negligence on the part of the first railroad. In this case the defense of the railroad company was that the company had delivered the shipment at the end of its line to the connecting railroad and had the latter's receipt that the shipment was in good order, coupled with evidence that nothing had occurred to the particular train on the road in which this shipment was carried. There was no proof that the shipment was examined and its actual condition known at the time it was given over to the connecting road. On these facts the Supreme Court affirms verdict against the company.[8]

In Pennsylvania the Supreme Court holds that a railroad is not liable for fires caused by sparks emitted from an engine, if the engine was provided with a spark arrester proved to be the best known, and in use upon a majority of all the locomotives in this country. In such an action evidence is not admissible to show that the company was in the habit of refusing to adopt certain appliances to modify the discharge of smoke from locomotives which could be had by paying for them; and that because these appliances were patented the defendant refused to pay a bonus for their use, but when the patents expired, it would adopt them into general use.[9]

In Kansas the Supreme Court rules that the statute of that state of 1885, as to firing woods, marshes, etc., does not authorize a recovery against a railroad company for a fire caused by burning dry grass and weeds on its right of way, in the performance of its duty to prevent an accumulation thereof, when there is no negligence or carelessness on the part of the company, and when the damages claimed are the result of unavoidable accident only.[10]

Injuries to Passengers, Employes and Strangers.

In Georgia the plaintiff was a passenger on a freight train, which arrived at his destination on a dark night. The conductor left him on the train, taking away the only lantern, and one of the train hands told him to leave the cab, but no light was furnished, and, in attempting to follow an employé to the depot, he fell a distance of about 20 ft. to the ground from the top of a perpendicular embankment on which the train was stopped. The edge of such embankment was only about three feet from the side of the train he got out at, with no fence to protect people from falling over; and he had no knowledge of the danger, or warning of it from any one. The Supreme Court holds that the plaintiff is entitled to damages.[11]

In North Carolina a passenger who was familiar with the methods of night mixed freight and passenger trains, and knew that there was more bumping and jolting in the coupling of such trains than ordinary on passenger trains, was sitting on the arm of a seat, when the engine, with the freight car attached, were thrown back with a sudden shock, causing plaintiff to be thrown against the corner of the seat in his rear, and injured. The Supreme Court rule that he was guilty of contributory negligence and cannot recover.[12]

In Kansas the Supreme Court lays it down that the law does not require a railroad company to direct the movement of its trains by orders from the train dispatcher alone, nor by a system of signals only; nor does it require the company to adopt any particular form of orders or any particular system for communicating them, but the company has the right to direct the movement of its trains by train orders alone, or by train orders of any form, and signals, or by signals alone, or by time card alone, provided that the means adopted are brought to the knowledge of its employés and they are reasonably well calculated to secure the safety of the men if obeyed by them. A railroad company is not required to change its orders or signals for the movement of its trains because some other railroad has adopted a different system of orders or signals; and a railroad company may even have in use a system of orders or signals shown to be less safe than that adopted on another railroad, without being liable to its employés for the consequences of the use of such orders or signals if the orders and signals in use are reasonably well calculated to secure the safety of the employés of the company, if obeyed by them. Whether a railway company has been guilty of negligence in the use of certain orders and signals for the movement of its trains, cannot be determined by proof that another railroad has adopted a different order for the operation of its trains.[13]

In Kansas it is held by the Supreme Court that between a railroad and its employés the former is required to exercise reasonable and ordinary care and diligence, and only such in furnishing to its employés reasonably safe machinery and instrumentalities for the operation of its road. In this case, which was an action brought by an injured employé of a railroad company to recover for personal injuries caused by a collision between two trains upon a railroad in Missouri, where the rule of the common law as to the relation of master and servant is in force, the issue was whether the collision occurred by the negligence of the train dispatcher or the conductor, who was a fellow-servant with the injured employé. Upon the trial there was evidence tending to show negligence on the part of the conductor, in disregarding the signals carried by a train he was to meet, and that his train collided with the second section of another train on account

of his misunderstanding the words of a conductor, as his train was passing. The Supreme Court decides that the railroad company was entitled to an instruction to the jury that the conductor had no right to disregard his orders, and the directions conveyed to him by the signals, on account of the information he supposed he was receiving from the conductor of the meeting train.[14]

In the same state an employé was injured on a bridge. It appeared that the bridge had remained in the same condition for two years prior to the injury, and the plaintiff had crossed it nearly every day during that time and knew its condition, and had, the day before the injury occurred, told the engineer in charge of the engine on which he was employed that it was unsafe and that he would get off the engine at the west end of it thereafter, and would not get off the engine on the bridge any more. The Supreme Court holds that the company is not liable.[15]

In Iowa a railroad had in force a rule that brakemen must know that their signals are understood and obeyed before they place themselves in a position of danger relying on such obedience. When they act without such knowledge, they assume all risk of danger arising from disobedience of the signal. Plaintiff, a brakeman, knew of this rule, and also knew that engineers were liable to increase the speed in making a coupling, unless they got a signal to slacken. Plaintiff signaled the engineer to slacken, and without waiting to know if his signal was understood, stepped in between the cars. The engineer suddenly increased the speed of the train, and he was injured. The Court instructed the jury that if plaintiff violated the rule, and such violation contributed to his injury, he could not recover unless defendant had waived the rule. The Supreme Court held that there being no evidence that any officer charged with its enforcement knew that the rule was violated, the instruction was error.[16]

In Wisconsin the Supreme Court rules that where one employed as foreman of a gang of men in building bridges, who is of mature years and ordinary intelligence, is directed to take an engine and his men and do some switching, temporarily, and consents, without objecting on account of want of experience in such work, no negligence can be predicated against the employer from such facts, when he is injured in coupling cars, which he was not personally directed to do, by a defect in the appliances, not shown to have been known to the railroad.[17]

In Virginia the only ingress and egress to the house which a person started from was by way of the company's tracks, which had been, with the acquiescence of the company, for a long time the common pathway of the public to and from such house and its vicinity to the city of Lynchburg. The person stepped off the side track on to the main track to avoid a material-train, and was killed by a yard-engine and tender, which was not visible when he came onto the track, being around a bluff, but was backing at a high rate of speed, within the city limits and contrary to its ordinances, in the direction he was walking; and the engineer failed to look out, or blow the whistle, or give any warning. The Supreme Court of Appeals holds that the railroad is liable for his death. The tracks having become a pathway for the public with the acquiescence of the railroad, he was not a trespasser.[18]

In Michigan when a traveler riding in a wagon was killed at a crossing it appeared that the railroad crossed the highway obliquely; that there was no serious obstruction to the view of an approaching train; that deceased was sitting with his back to and his face turned away from the train, approaching with little noise and great speed; that deceased did not look up or change his position until his horse's feet struck the iron rail; that deceased was acquainted with the situation of the crossing. The evidence was conflicting as to whether any signals of the approach of the train were given. The Supreme Court held that the traveler was guilty of contributing negligence, and the railroad is not liable.[19]

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1 U. S. v. L. & N. R. Co., 33 Fed. Rep., 829.
2 Farmers' L. & T. Co. v. V. & M. R. Co. 34 Fed. Rep., 778.
3 [illegible] v. A. & F. R. Co., 5 S. E. Rep., 684.
4 Harmon v. C. & G. R. R. Co., 5 S. E. Rep., 835.
5 [illegible] v. P., R. & A. R. Co., 5 S. E. Rep., 831.
6 H. & St. J. R. Co. v. Kanally, 17 Pac. Rep. 324.
7 Norton v. M. & M. Trans. Co., 5 N. Eng. Rep., 906.
8 N. Y. Cent. R. Co. v. Eby, 11 Cent. Rep., 445.
9 P[illegible] Co. v. Page, 1[illegible] Cen. Rep., 425.
10 A., T. & S. F. R. Co. v. Dennis, 17 Pac. Rep., 152.
11 Smith v. C. R. & R. Co., 5 S. E. Rep., 772.
12 Smith v. R. & D. R. Co., 5 S. E. Rep., 899.
13 [illegible] & St. J. R. Co. v. Kanally, 17 Pac. Rep., 324.
14 H. & St. J. R. Co. v. Kanally, 17 Pac. Rep., 324.
15 Wells v. Mo. Pac. R. Co., 17 Pac. Rep., 306.
16 Reed v. C. R. I. & P. R. Co., 37 N. W. Rep., 124.
17 Colvin v. C. & N. W. R. Co., 37 N. W. Rep., 84.
18 V. M. R. Co. v. White, 5 S. E. Rep., 571.
19 Matti v. C. & W. M. R. Co., 37 N. W. Rep., 54.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, 2 per cent., payable June 30, to stockholders of record June 1.

Connecticut River, quarterly, 2 per cent., payable July 2, to stockholders of record June 1.

Delaware & Hudson Canal Co., quarterly, 1½ per cent., payable June 15.

Germantown & Norristown, quarterly, 3 per cent., payable June 4.

Little Miami, 1 per cent., payable June 11, to stockholders of record May 31.

Old Colony, 3 5-10 per cent., payable July 2, to stockholders of record May 30.

Philadelphia, Wilmington & Baltimore, semi-annual, 3 per cent., payable July 2 to stockholders of record June 15.

Whitefield & Jefferson, annual, 6 per cent., payable June 20.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Brooklyn & Montauk, special meeting, 120 Broadway, New York, June 11.

Chicago, Burlington & Northern, annual meeting, La Crosse, Wis., June 13.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, Hudson, Wis., June 9.

Cincinnati, Hamilton & Dayton, annual meeting, Cincinnati, O., June 19.

Milwaukee, Lake Shore & Western, annual meeting, Milwaukee, Wis., June 13.

Oregon Improvement Co., annual meeting, Portland, Or., June 18.

Oregon Railway & Navigation Co., annual meeting, Portland, Or., June 18.

Oregon & Transcontinental, annual meeting, Portland, Or., June 18.

Pittsburgh, Fort Wayne & Chicago, special meeting, Pittsburgh, Pa., June 13.

St. Joseph & Grand Island, annual meeting, Elwood Kan., June 12.

St. Paul & Duluth, annual meeting, St. Paul, Minn., June 18.

Toledo, St. Louis & Kansas City, annual meeting, Toledo, O., June 13.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Association*, annual convention, Alexandria Bay, N. Y., commencing June 12.

The *American Railway Master Mechanics' Association*, next annual convention, Thousand Islands, N. Y., June 19.

The American Society of Civil Engineers will hold its annual convention in Milwaukee, Wis., the last week of June.

The *Ohio Institute of Mining Engineers* will hold its summer meeting at Logan, O., commencing July 11.

The *International Association of Car Accountants* will hold its annual meeting in Montreal, Can., June 19.

The *American Train Dispatchers' Association* will hold its fifth annual meeting at Louisville, Ky., June 12.

The *National Association of General Passenger and Ticket Agents* will hold its fall meeting in Saratoga, N. Y., Sept. 18.

The *National Association of General Baggage Agents* will hold its next meeting in New York City July 18.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The *Western Railway Club* meets in Chicago the third Wednesday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, N. Y.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *Engineers' Society of Western Pennsylvania* meets in Pittsburgh the third Tuesday of each month.

Railroad Accounting Officers.

The committee of 15 appointed at the Washington Convention of Accounting Officers to arrange for an association of railroad accounting officers has called a convention to meet at the Hotel Brunswick, in New York City, at 11 o'clock a. m., July 25. The committee received nearly 200 communications from representatives of the accounting departments of different roads, commending the enterprise and promising it their hearty support. It is therefore an assured success.

American Society of Civil Engineers.

The annual convention for the year 1888 will be held at Milwaukee, Wis., beginning Thursday, June 28, 1888. Meetings for professional discussion and for the transaction of business will be held on Thursday, Friday, Saturday and Monday. Arrangements will be made for visits to points of engineering interest in the Northwest, the details of which are in progress and will be announced when perfected. It is expected that these will occupy the time till after Wednesday, July 4. The return from the convention will probably be towards the close of the week ending July 7.

The Trunk Line Association, the Central Traffic Association, the Western States Passenger Association and the Southern Passenger Association have arranged a rate for the round trip of one and one-third the single fare. Full first class fare going must be paid, and a certificate of such payment secured from the ticket agent to whom the fare is paid. Unless other instructions are received, the ticket must be bought to Chicago, and another ticket bought from Chicago to Milwaukee. The ticket agents' certificate must be secured on the purchase of each of these tickets. The tickets must not be purchased before June 25.

Arrangements will be made for a special train from New York to Milwaukee, to leave New York on Tuesday, June 26. This train will leave Chicago for Milwaukee about noon of June 27.

The President of the Society, Thomas C. Keefer, Esq., will deliver the Annual Address. Members and other engineers are invited to present papers or discussions, and to inform the secretary at once as to their intention to do so, in order that the programme of meetings may be arranged.

The following new papers will be presented at the Convention:

Improvement of Rivers on the Atlantic Coast, William P. Craighill; High Walls or Dams to resist the Pressure of Water; James B. Francis; Maintenance of Railway Structures, Henry D. Blunden, also a general discussion on this subject; Formulas for the Weights of Bridge Trusses, A. J. Du Bois; An Investigation to determine the Strains in a Hollow Cast-iron Disk, cooled from the Interior, G. Leverich; English Railroad Track, E. E. Russell Tratman; An Automatic Waste Weir, A. D. Foote; Some Facts in relation to Friction, Waste and Loss of Water from Mains, Charles B. Brush.

Reports will be expected from the Committees on Uniform Standard Time; To consider the proper Relations to Each Other of the Sections of Railway Wheels and Rails; On the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry; On Grades and Titles of Engineers on Public Works, and those subjects will be discussed.

Engineers' Club of St. Louis.

At a regular meeting held May 30, the following report was received and the committee discharged:

"The committee appointed by the President to consider the advisability of this club co-operating with the Kansas City and other engineering clubs in reference to proposed state legislation for the safety of public bridges, as indicated in the herewith accompanying report of the Kansas City club, do unanimously agree that we regard it desirable for our club to co-operate with them for the object specified. We deem in the duty of the club to aid such action from both a public and professional standpoint, and think that persistent effort will succeed in finally obtaining such legislative action on this important matter, in which the engineering clubs should take the initiative. [Signed]

" H. A. WHEELER,
" C. H. SHARMAN,
" MAX G. SCHINKE, } Committee."

It was decided to appoint a committee of three to co-operate with the Engineers' Club of Kansas City, and others, in furthering legislation on the subject of improvements in highway bridges. The Chair appointed Messrs. Robert Moore, C. H. Sharman and A. W. Hubbard as the committee.

Mr. R. E. McMath read a paper on "The Water-Way between Lake Michigan and the Mississippi River by way of the Illinois River." The author having been in charge of the government work on the Illinois River for some years, was able to treat the question in the light of experience. He referred to canals in general and gave special attention to the various schemes connected with the Illinois River, as well as the Hennepin canal and the complications due to the Chicago drainage. He considered his subject under the following heads: Physical, Sanitary, Economical and Political. The author thought the scheme was of great importance and promised decided benefits. The paper was discussed by Messrs. Seddon, Professor Johnson, Wheeler, Bouton and Holman. On motion it was ordered that 1,000 copies of this paper be printed for circulation.

The special order of the day was action on the recommendations contained in the report adopted at the last meeting, on the subject of National Public Works. The report provided for a committee on finance and one on correspondence. The following committees were chosen: Finance, J. B. Johnson, R. E. McMath, Robt. Moore, W. B. Potter and E. D. Meier. Correspondence, J. B. Johnson, R. E. McMath, E. D. Meier, F. E. Nipher and C. M. Woodward.

Rates to the Conventions.

The Central Traffic Association, after deciding to make no reduction in regular fares to persons attending the conventions of the Master Car-Builders and Master Mechanics at Alexandria Bay, N. Y., as announced last week, has reconsidered its action, and on May 31 informed the secretaries that all who pay full fare going to the conventions from the principal points in the territory of the Central Traffic Association, and obtain, when purchasing their tickets, the proper certificates, will be returned at one third fare.

Association of Railway Telegraph Superintendents.

The seventh annual meeting of the association will be held at the Murray Hill Hotel, New York, at 10 a. m., July 11, 1888. Suitable rooms for the meetings of the association and for the exhibition of mechanical and electrical devices, used in railway work, have been provided. The following committees will have charge: Space for exhibits, Messrs. Topping, Holmes and Bogart; electric lighting and heating, Messrs. Kinsman, Swift and Torrey; telegraph and telephone appliances, Messrs. Bogart, Holmes and Leonard; miscellaneous electrical devices and novelties, Messrs. Selden, Shaw and Hope. Members and applicants are requested to notify the secretary, P. W. Drew, 164 Dearborn street, Chicago, of their intention to be present.

PERSONAL.

—Thomas W. Johnston, Secretary and Auditor of the San Francisco & North Pacific, has tendered his resignation, on account of failing health.

—Mr. Thomas Mellersh, who has been Assistant Comptroller of the Cincinnati, New Orleans & Texas Pacific for eight years, has resigned to accept a position with an eastern manufacturing company.

— A committee of conductors and other employés of the Boston & Lowell presented Mr. C. S. Mellen, the retiring General Superintendent, with a massive silver pitcher and salver with the following inscription engraved on the salver: "C. S. Mellen, from engineers and conductors of the B. & L. R. R." A neatly engraved note accompanied the articles.

—Mr. John B. Wilson, late Mechanical Superintendent of the Duluth, South Shore & Atlantic, has been presented with an elegant open-face gold watch, with chain and seal, by the employés of his department, as a mark of the high esteem in which they held him. Accompanying the gift was a testimonial, handsomely engrossed and framed, and signed by all the employés of the department. Mr. Sidney B. Flower, the retiring Train Master of the same road, was also presented by the employés with a purse containing about $200 in gold.

—P. S. Eustis, who succeeds Paul Morton as General Passenger Agent of the Chicago, Burlington & Quincy, has been General Ticket and Passenger Agent of the Burlington & Missouri River, in Nebraska, for the last eight years. He has been connected with the Burlington & Missouri River system since he first entered the railroad service, having been clerk in various departments.

—William L. Baker, who for many years was Superintendent and Engineer of the Detroit Bridge & Iron Works, died May 30, at his residence in Detroit, having been in failing health for nearly three years. Mr. Baker was born in 1850, and graduated from the Troy Polytechnic Institute as civil engineer, in 1871, soon after which he became connected with the Detroit Bridge & Iron Works. He was ardently devoted to his professional studies and occupations. Bridges of his design are in use on many of the northwestern roads, and are characterized by simplicity and directness of design, and thoroughness of execution. He leaves a widow and two children.

ELECTIONS AND APPOINTMENTS.

Anniston, Williamsport & Highland.—The incorporators of this Alabama road are W. H. Williams, James Cartrell, H. Mobbitt, W. F. Johnston, R. L. Bowcock, Milton A. Smith and E. C. Anderson, all of Anniston.

Atchison, Topeka & Santa Fe.—C. W. Cook has been appointed Assistant General Freight Agent of this road, and the Chicago, Kansas & Western, with headquarters at Topeka, Kan., vice C. A. Parker, resigned.

Atlanta & Florida.—Henry L. Collier has been appointed Superintendent, with headquarters in Atlanta, vice A. Shaw, resigned.

Baltimore & Ohio.—L. J. Buckley has been appointed Acting Purchasing Agent, vice Major N. S. Hill, resigned. The position of Superintendent of Construction has been discontinued, and John Bradshaw has been appointed Lumber Agent, with headquarters at Baltimore. He will also purchase all cross-ties for lines east of the Ohio River.

Baltimore & Potomac.—At the annual meeting in Baltimore, Md., June 6, the following officers were re-elected: Oden Bowie, President; Frank Thomson, Vice-President; John S. Leib, Treasurer; James P. Kerr, Secretary.

Billings, Clark's Fork & Cooke City.—Charles F. Roberts was re-elected President, George V. Sims Vice-President, and Theodore Franklin Secretary, at the annual meeting in New York, June 5. Directors were also elected as follows: Charles F. Roberts, Milton Sayler, Henry Kelly, George V. Sims and P. M. Gallaher.

Canada Southern.—The annual meeting was held in St. Thomas, Ont., June 6, and the following were elected Directors: Cornelius Vanderbilt, William K. Vanderbilt, James

Tillinghast, Anthony G. Dullman, Charles F. Cox, Samuel F. Barger, Sidney Dillon, Joseph E. Brown and Edward A. Wickes.

Chicago, Burlington & Quincy.—P. S. Eustis has been appointed General Passenger Agent, to succeed Paul Morton.

Chicago & Grand Trunk.—F. R. Dwyer has been appointed General Eastern Passenger Agent, with office in New York, and W. R. Jaffrey succeeds him as Northwestern Passenger Agent.

Chicago, Milwaukee & St. Paul.—At the annual meeting in Milwaukee, Wis., the following directors were elected: Philip D. Armour, Chicago; Roswell Miller and John Plankinton, Milwaukee; Jason C. Easton, La Crosse; Frank S. Bond, Hugh T. Dickey, Peter Geddes, George C. Magoun, Joseph Milbank, William Rockefeller, James Stillman, A. Van Santvoard, James T. Woodward, all of New York. The only change is the election of Roswell Miller in place of Selah Chamberlain, of Cleveland. Roswell Miller was elected President and General Manager.

Chicago, Rock Island & Pacific.—At the annual meeting in Chicago, June 6, 352,125 shares of the capital stock were represented. The five directors whose term had expired—David Dows, H. R. Bishop, and Sidney Dillon, of New York, and R. R. Cable and Hugh Riddle, of Chicago—were unanimously re-elected. After the adjournment of the stockholders' meeting the board of directors met and elected the following officers: President, R. R. Cable; Vice-Presidents, David Dows and W. G. Purdy; Secretary and Treasurer, W. G. Purdy. James R. Cowing was reappointed Assistant Secretary and Assistant Treasurer in New York, and John F. Phillip was appointed to a similar position in Chicago. The Executive Committee is composed of Hugh Riddle, David Dows, R. R. Cable, H. R. Bishop and Benjamin Brewster.

Chicago & Western Indiana.—The annual meeting was held in Chicago, Ill., June 5, and but one change was made in the directory, J. F. Goddard being elected to fill the vacancy caused by the transfer of C. W. Smith to Boston. John F. Murphy was appointed Treasurer, vice, G. W. Stokes, who declined a re-election.

Cleveland, Columbus, Cincinnati & Indianapolis.—P. H. Metzger has been appointed Contracting Agent, with office at Cincinnati, O., to succeed O. G. Fetter, promoted.

Colorado Midland.—John Scott has been appointed President, to succeed J. J. Hagerman, who resigned, owing to ill-health.

Concord & Claremont.—At the annual meeting in Concord, N. H., May 30, the following were elected directors: Dexter Richards, Newport; A. W. Sulloway, Franklin; D. W. Johnson, Claremont; J. H. Benton, Jr., C. O. Stearns and A. E. Scott, Boston; G. E. Todd, Concord. The Board organized with D. Richards, President; C. B. Sanborn, Concord, Secretary; G. A. Kettel, Boston, Treasurer; G. E. Todd, Concord, Assistant Treasurer.

Cooperstown & Charlotte Valley.—G. M. Jarvis has been appointed Secretary and Treasurer, with office in Cooperstown, N. Y.

Coquille River & Coos Bay Transportation Co.—Incorporated in Oregon by G. W. Loggie, S. F. Wilson and C. F. Lovelace.

Dayton, Fort Wayne & Chicago.—At the annual meeting of the stockholders, held in Dayton, O., June 5, the following directors were chosen: Nelson Cromwell, George W. Hoadly, Alfred Jaretzki, George C. Comstock, George C. Wattles, of New York; John C. Combs, of Boston; Eugene Zimmerman, Judson Harmon, Richard Folsom, F. H. Short, Julius Dexter, of Cincinnati; R. D. Marshall, of Dayton; T. E. Burton, of Cleveland. The Board organized by electing Eugene Zimmerman President, and Alfred Jaretski, of New York, Secretary. The election of a treasurer was deferred.

Des Moines & Northwestern.—W. A. Jennings has been appointed General Freight Agent, with office in Des Moines, Ia., to succeed Frederick Wild, Jr.

East Tennessee, Virginia & Georgia.—W. H. Evans has been appointed Master of Transportation of the Alabama Division vice George D. Lawrence, resigned to accept a position on another road.

Elkhart & Western.—The following are the directors of this Indiana company: H. E. Buckleff and W. J. Davis, of Chicago; J. R. Beardsley, E. C. Bickel, S. Maxon, C. H. Winchester, and J. L. Broderick.

Fort Worth & Denver City, Denver, Texas & Fort Worth and Denver, Texas & Gulf.—R. H. Johnson has been appointed Superintendent of Motive Power and Machinery, with headquarters at Denver, Col.

Georgia, Carolina & Northern.—The officers of this company are Gen. R. F. Hake, Raleigh, N. C., President; A. L. Hull, Athens, Ga., Treasurer; J. S. Morrison, Monroe, N. C., Chief Engineer.

Hot Springs & Western.—The first board of directors of this Arkansas company is as below: Edward Hogaboom, A. B. Gaines, C. D. Greaves, of Hot Springs; D. S. Taylor and G. W. Meeker, of Chicago, Ill.

Jacksonville, Mayport & Pablo.—H. S. Ming has been appointed General Superintendent, with office in Jacksonville, Fla., and O. G. Finch has been appointed Assistant General Superintendent.

Jacksonville, Tampa & Key West.—G. D. Ackerly has been appointed general passenger agent, with office in Jacksonville, Fla.

Jonesboro & Nolachucky.—The incorporators of this Tennessee company are as follows: E. L. Deaderick, J. A. Pierce, John P. Smith, A. C. Hoss and Guy C. Sabin.

Kansas City, Richfield & Trinidad.—The incorporators and first board of directors of this Kansas company are as follows: W. D. Hudson, B. C. Mitchell, A. T. Spotswood, B. McCaffrey, F. F. Stevens, V. N. Sayer, H. S. Bunting, W. C. Burchstead, J. C. McKee, all of Richfield, Morton County; W. L. Harris, Westold; J. W. Beatty, Taloga; J. H. McCune, Maud, and C. B. Pach, Cundliff.

La Crosse, Mineral Point & Highland.—The incorporators of this Wisconsin company are: Calvert Spensely, Albert W. Cobb, W. H. Bennett, Philip Allen, Jr., Charles McIlhon, W. A. Jones, all of Mineral Point; Richard Kennedy, of Highland; O. O. Dahl, of Soldiers' Grove, and B. F. Washburn, of Excelsior. The above, with the exception of the last two, constitute the first board of directors.

Louisiana, Missouri & Arkansas.—The following officers and directors were elected at the annual meeting in Brinkley, Ark., May 30: President, Arthur W. Soper, of New York; Secretary, Harlow M. Hoyt, of New York; Treasurer, J. J. Slocum, of New York. Directors: W. W. Johnson, of Arendon; H. H. Myers, T. H. Jackson, George A. Rich, J. M. Folks and J. E. Craig, of Brinkley.

Missouri Pacific.—Charles Weller has been appointed Master Mechanic of the shops at Atchison, Kan.

Nashua & Lowell.—The old board of directors were re-elected at the annual meeting at Nashua, N. H., May 30, as follows: G. K. Richardson, F. A. Brooks, Boston; J. W. White, W. W. Bailey, Nashua, N. H.; A. M. Shaw, Lebanon, N. H.; Treasurer, J. W. White, Nashua, N. H.; Secretary, W. A. Lovering, Nashua, N. H. At a subsequent meeting of the directors F. A. Brooks was re-elected President.

Nebraska Western.—The incorporators of this new Nebraska company are: James D. Negus, D. McLean, M. R. Jones, Albert Ingard and D. L. Paige.

New Castle & Shenango Valley.—The officers and directors of the company are as follows: G. W. Johnson, President; L. Raney, Vice-President; G. W. Hartman, Treasurer; Chas. S. Wallace, Secretary; directors, G. W. Johnson, L. Raney, S. M. Felton, Jr., M. S. Marquis, P. L. Kimberly, Chas. E. Whitehead, E. A. Wheeler, Chas. S. Wallace. The general office is in New Castle, Pa.

New York, Chicago & St. Louis.—S. K. Blair has been appointed Trainmaster of the Western Division, in place of E. H. Hunsaker, resigned. D. H. Caldwell will succeed Mr. Blair as Chief Dispatcher of the Western Division.

New York, Lake Erie & Western.—J. F. Maguire has been appointed Superintendent of the New York & Greenwood Lake division, with office in Jersey City, N. J.

Northern (New Hampshire).—Directors were elected as follows at the annual meeting in Concord, N. H., May 31: A. W. Sulloway and George W. Nesmith, of Franklin; George E. Todd, of Concord; Silas Pierce, Benjamin P. Cheney, Josiah H. Benton, Jr., and Uriel H. Crocker, of Boston.

Northern Pacific.—George S. Baxter has been appointed Treasurer to succeed Robert Lenox Belknap, resigned.

Ocean Air Line.—The following are the incorporators of this new California company: Eugene Germain, Frank M. Keach, H. L. Flash, A. J. Healey and S. H. McIlheny. E. Germain has been elected Treasurer and A. J. Healey General Manager. The general office is in Los Angeles.

Omaha & St. Louis.—F. M. Gault has been appointed General Manager, with headquarters at Council Bluffs, Ia., to succeed the late Thomas McKissock.

Pacific (in Nebraska and Missouri).—The annual meeting of the stockholders was held at Hastings, Neb., June 4. The following directors were elected: Edwin Gould, New York; Church Howe, Auburn, Neb.; E. G. Merriam, St. Louis; E. P. Waggoner, Atchison, Kan.; S. H. H. Clark, St. Louis; W. P. McCleary, Hastings, Neb.

Pacific Mail Steamship Co.—At the annual meeting held in New York June 1, the following directors were chosen: Jay Gould, Sidney Dillon, Russell Sage, C. P. Huntington, Henry Hart, William Remsen, Edward Lauterbach, Harvey Kennedy and George J. Gould.

Pemigewasset.—The old board of directors was re-elected at the annual meeting last week, as follows: S. N. Bell, of Manchester, N. H.; Daniel Saunders, of Lawrence; N. H. Weeks, of Plymouth; J. W. Campbell, of Woodstock; Daniel Barnard, of Franklin; J. C. French and Henry Chandler, of Manchester; John J. Cilley, of South Deerfield; G. W. Hills, of Lawrence.

Pennsylvania Company.—At the annual meeting in Pittsburgh, Pa., June 5, the following directors were elected: George B. Roberts, Henry H. Houston, Wistar Morris, Edmund Smith, Henry D. Welsh, J. N. Dubarry, John P. Wetherell, John P. Green, William H. Barnes, of Philadelphia; J. N. McCullough, William Shaw, Thomas D. Meisler and James McCrea, of Pittsburgh.

Peterborough & Hillsborough.—At the annual meeting in Concord, N. H., May 31, the following were elected directors: Alvah W. Sulloway, of Franklin; John C. Campbell of Millsboro; Jacob H. Benton, Jr., of Boston; Wyman Pattee, of Enfield; George E. Todd, of Concord; William Power Wilson, of Lexington; Seth M. Richards, of Newport. The board elected A. W. Sulloway President, and Hon. E. H. Woodman, of Concord, Secretary and Treasurer.

Pine Bluff, Princeton & Arkadelphia.—The officers of this new Arkansas company are: J. B. York, President; J. T. Rutherford, Secretary, and H. L. Peck, Treasurer.

Portland & Vancouver.—R. A. Habershaw, Portland, Or., is Chief Engineer of this New Oregon company.

Portsmouth & South Mills.—The company has been organized with the following officers and directors: President, John H. Hume, Portsmouth, Va.; Secretary, William H. Stewart, Portsmouth. Directors: A. H. Lindsay, John T. West, W. A. West, T. J. Barlow.

Prince Edward Island.—J. Unsworth has been appointed Superintendent, in addition to his duties as Mechanical Superintendent.

Richmond & Chesapeake.—Charles E. Bevlin is President of this Virginia company; R. E. O'Brien, New York, is Chief Engineer; and N. L. Lum, Richmond, Engineer in Charge.

Richmond & West Point Terminal.—At a special meeting in Richmond, Va., last week, the following were elected directors to fill vacancies in the board: W. S. Chisholm, of Georgia, and John C. Calhoun, of New York. John H. Inman was elected President for the remainder of the unexpired term.

Rochester & Glen Haven.—The officers of this road are: F. S. Minges, President; S. A. McKenney, Vice-President; Edward W. Maurer, Secretary and Attorney; James Palmer, Jr., Treasurer; William C. Gray, Chief Engineer. The general office is in Rochester, N. Y.

Rome, Watertown & Ogdensburg.—H. C. Davis has been appointed Contracting Agent, with office in Rochester, N. Y.

St. Johns, Lake Weir & Gulf.—Col. J. H. Watts, Lynchburg, Va., is President of this Florida company and J. H. McPeters, Vice-President.

St. Louis, Alton & Terre Haute.—At the annual meeting of the bond and stockholders held in St. Louis, June 5, the following directors were re-elected: Edward A. Litchfield, George W. Parker, Ed Wiley, F. H. Youngblood and W. K. Murphy. After the stockholders' meeeing the directors elected the following officers: George W. Parker, President and General Manager; E. F. Leonard Secretary; H. A. Crosby, Assistant Secretary; H. T. Nash, Auditor. A new office, the Chairman of the Board, was created, with office in New York, to have charge of the financial affairs of the company in that city, and George Foster Peabody was chosen as Chairman.

St. Paul, Minneapolis & Manitoba.—George L. Bonney has been appointed Superintendent of sleeping and dining cars, with office in St. Paul, Minn., vice E. H. Brown, resigned.

Southern Pacific.—W. G. Curtis has been appointed assistant to General Manager Towne, in addition to his duties as Superintendent of Track.

J. H. Wallace has been appointed Assistant Superintendent of Track, with headquarters at San Francisco.

H. Hawgood has been appointed Division Roadmaster of the Yuma, Gila and Tucson divisions and the branch lines south of Sepulveda, with headquarters at Los Angeles, vice J. H. Wallace, promoted.

Sullivan County.—At the annual meeting in Concord, N. H., May 31, directors were elected as follows: A. B. Harris, of Springfield, Mass.; Frederick Billings, of Woodstock, Vt.; Henry C. Robinson, of Hartford, Ct.; John H. Albin, of Henniker; Nathaniel E. Martin, of Concord, and Charles J. Amidon, of Hinsdale. The board organized with A. B. Harris, President, J. H. Albin, Secretary, and E. F. Lane, of Keene, Treasurer.

Tennessee Midland.—The following list of officers and directors is announced: Officers—A. S. Buford, President; T. C. Leake, Jr., Vice-President; R. H. Temple, Chief Engineer; Ben Wilson, General Manager; R. L. Traylor, Secretary; P. L. Jones, Treasurer; J. P. Meredith, Superintendent; J. T. Garner, General Freight and Passenger Agent; T. T. Talley, Auditor. Directors—A. S. Buford, T. C. Leake, Jr., Jas. T. Gray, R. H. Temple, Richmond, Va.; B. A. VanSchaick, Philadelphia, Pa.; G. W. Macrae, R. L. Traylor, W. S. Bruce, W. D. Bethell, Memphis, Tenn.

Union Pacific.—W. P. Baldwin, Jr., has been appointed Assistant General Freight Agent, with headquarters at Omaha.

Washington Short Line.—The first board of directors of this company is as follows: Allen C. Mason, F. A. Sears, J. W. Pinkerton and C. S. Reeves, all of Tacoma.

Western New York & Pennsylvania.—R. Bell has been appointed Superintendent of the Pittsburgh Division, with headquarters at Oil City, Pa., vice J. T. Gardner, resigned.

Whitefield & Jefferson.—At the annual meeting last week directors were elected as follows: Alson L. Brown, Warren; G. Brown, Whitefield; Nathan R. Perkins, Jefferson; Ossian Ray, Lancaster; S. N. Bell, Manchester; W. A. Stowell, Montpelier, Vt.; George C. Lord and C. E. A. Bartlett, Boston.

Wilton.—At the annual meeting in Nashua, N. H., May 30, the following directors were chosen: Solomon Spalding, J. A. Spalding, Nashua; William Ramsdell, Milford; Harvey Whiting and G. O. Whiting, Wilton.

Winnipeg & Southeastern.—The following officers were elected at a meeting in Winnipeg, May 28: President, W. F. Alloway; Secretary and Treasurer, Kenneth Mackenzie.

Winona & Southwestern.—Matthew G. Norton, Winona, Minn., is Treasurer of this company.

OLD AND NEW ROADS.

New Companies Organized.—Anniston, Williamsport & Highland Cave.—Coquille River & Coos Bay Transportation Co.—Elkhart & Western.—Emporia & Council Bluffs.—Greenwood Lake & Port Jervis.—La Crosse, Mineral Point & Highland.—Lenora, Oberlin & Northwestern.—Mississippi & Mexican Gulf.—Nebraska & Western.—Ocean Air Line.—Pine Bluff, Princeton & Arkadelphia.—Portsmouth & South Mills.—Slatington.—Washington Short Line.

Anniston, Williamsport & Highland Cave.—Articles of incorporation filed in Alabama to construct a road from Anniston, Ala., to Williamsport via Highland Cave. The capital stock is $120,000.

Baltimore & Ohio.—Tracklaying has been commenced on the Berkeley Springs & Potomac road, which is building from Hancock to Berkeley, Md., 6 miles, and nearly all the grading has been completed. Charles Goldsborough is the engineer.

Billings, Clark's Fork & Cooke City.—The President has signed the bill granting the road right of way through the Crow Indian Reservation in Montana, and it is stated that work will commence very soon. The road is to be built from Billings, Mont., along the Clark's Fork River to Cooke City.

Boston, Concord & Montreal.—Resolutions were adopted at the annual meeting last week authorizing steps to be taken toward the construction of the Tilton & Belmont, Tilton & Franklin and Lake Shore roads, and negotiations looking to future consolidation with the Concord and Northern roads were formally approved.

Camden, Gloucester & Mt. Ephraim.—The Kaighn's Point Terminal road, which is being built from Camden, N. J., to Kaighn's Point Ferry, has now been almost completed, and it will be opened in a few weeks.

Canastota, Morrisville & Southern.—The preliminary survey between New Berlin and Earlville, N. Y., has been completed, and it is stated that the grades were found to be comparatively easy. Walter F. Randall is Chief Engineer.

Chattanooga, Rome & Columbus.—Tracklaying has been completed south to Buchanan, Haralson County, Ga., and has also been completed northwest from Bremen to within two miles of Buchanan, where tracklaying has been temporarily stopped to await the completion of grading at a cut.

Chesapeake, Ohio & Southwestern.—A mortgage for $3,000,000 on the road between Memphis, Tenn., and Louisville, Ky., has been filed, the proceeds to be used in constructing branch lines.

Chicago, Burlington & Northern.—It is stated that the right of way is being secured and surveys made for a branch line to Marshfield, Wis.

Cincinnati, Hamilton & Dayton.—In the suit of Cromwell vs. Ives an injunction has been granted restraining Cristopher Meyer from voting on 64,000 shares of stock at the annual election to-day, and also from transferring the stock. Plaintiff claims the stock is collateral for a loan to Henry S. Ives & Co., and Meyer avers that he is the owner by purchase.

Cincinnati & Richmond.—It is announced that this road will be opened for traffic June 11. It is a branch of the Pittsburgh, Cincinnati & St. Louis, extending from Red Bank to Hamilton, O.

Columbus & Western.—It is expected that the Coosa mountain tunnel on the extension from Goodwater to Birmingham will be completed early next week, so as to allow

the tracks to be laid through it. Track is now completed up to both sides of the tunnel.

The plans for the repair shop at Birmingham have been completed. The contracts for the new round-house and turntable have also been let.

Concord.—A proposition to extend the Suncook Valley road, which is leased to the Concord, from Pittsfield to Barnstead, N. H., is under consideration.

Coquille River & Coos Bay Transportation Co.—Organized in Oregon to construct a railroad and telegraph line from Coos Bay to a point in Coos County on the Coquille River. Some preliminary surveying has already been made. W. R. Whipple is Chief Engineer.

Denver & Scranton.—The contract for the extension from the present eastern terminus at Scranton, Arapahoe County, Col., to the Kansas-Nebraska state line, an estimated distance of 150 miles, will be let in July. C. M. Wicker, Denver, Col., is General Manager.

Elkhart & Western.—Organized in Elkhart, Ind., to construct a road from Elkhart, westerly to Mishawaka, where connection will be made with the Chicago & Grand Trunk. It is stated that the capital stock has all been subscribed and that work will be commenced soon.

Emporia & Council Grove.—Chartered in Kansas to construct a road from Madison, Greenwood County, northerly to Emporia, thence northwesterly to Council Grove and thence through the counties of Morris, Davis, Riley, Pottawatomie, Clay, Washington and Marshall, to the north line of the state. The estimated length of the road is 200 miles. The capital stock is $3,000,000 and the principal office is in Council Grove.

Fort Worth & Denver City.—The telegraph line of the company extending from Fort Worth, Tex., to Denver, Col., has passed under the control of the Western Union Telegraph Co. It is the only direct telegraph line northwest from Texas.

Greenwood Lake & Port Jervis.—Chartered in New York to build a road from Port Jervis, through Warwick, to a connection with the New York & Greenwood Lake. The capital stock is $300,000.

Gulf, Colorado & Santa Fe.—Grading has been commenced on the extension from Ballinger to San Angelo, Tex.

Harrisburg & Wheeling.—Surveys are now in progress for this road, which is projected from Wheeling, W. Va., to Harrisburg, Pa. The line will pass through Chartiers, Canonsburg, Monongahela and Elizabeth.

Indianapolis, Chattanooga & Southern.—It is stated that the contracts for grading will be let as soon as the right of way between Indianapolis, Ind., and Chattanooga, Tenn., is secured, which it is expected will be done by Sept. 1. A reconnoissance has been made of part of the line. F. L. Patrick, Columbus, O., is President.

Jonesboro & Nolachucky.—Incorporated in Tennessee to construct a road from the North Carolina state line through Jonesboro to Kingsport near the Virginia state line.

Kansas City & Bonner Springs Rapid Transit.—A preliminary survey for this 15-mile suburban line has been made, and the right of way is being secured. W. A. Simpson is President.

Kansas City & Sabine Pass.—It is expected that construction will be commenced in July, and that the part of the road between Kansas City and Pierce City, Mo., 117 miles, will be completed this year. The contract for this has been let. John W. Weir, Kansas City, Mo., is Chief Engineer.

Kansas City & Southern.—The tracklaying was completed between Belton and Kansas City, Mo., June 2. The track was being laid from both points and met at a point 13 miles from Kansas City. It is expected that the entire line from Kansas City to Osceola will be placed in operation in July.

Knoxville, Cumberland Gap & Louisville.—The name of the Powell's Valley road has been changed to the above.

La Crosse, Mineral Point & Highland.—Articles of incorporation filed to construct a road from La Crosse in a general southeasterly direction, passing through the counties of La Crosse, Vernon, Crawford, Richland, Grant, Iowa, Lafayette and Green to a point at or near the southern boundary of the state. The estimated distance is 130 miles. The capital stock is $250,000.

Lenora, Oberlin & Northwestern.—Incorporated in Kansas to construct a road from Lenora, Norton County, northwesterly about 40 miles to Oberlin, Decatur County. Lenora is the present western terminus of the Central Branch Union Pacific, and Lenora is the terminus of a branch from the main line of the Burlington & Missouri River from Republican City, Neb. The capital stock is $2,000,000 and the principal office is to be in Oberlin.

Los Angeles & Ocean.—About half of the grading has been completed on this road, which is to extend from Los Angeles to Alamitos Bay, Long Beach, and San Pedro, Cal. Spillman & McDonald, Los Augeles, are the contractors.

Louisville & Nashville.—The contracts for grading that part of the Huntsville extension not already under contract will probably be let at once, and forces put at work from both ends of the line. An iron bridge will be built over the Tennessee River at Manchester, Ala.

Louisville, St. Louis & Texas.—Track has been completed from Owensboro toward West Point to a point beyond Lewisport, and is progressing rapidly. A force of convicts recently employed on the Louisville Southern have been transferred to this road. The right of way from Spottsville to Henderson, Ky., was purchased this week, so that land for the entire road has now been secured.

Louisville Southern.—The town election in Lexington, Ky., May 29, on the proposition to vote $100,000 to have this road build a 20-mile branch from Lawrenceburg easterly to Lexington, resulted in a large majority in favor of the subscription.

On the formal opening of the road between Louisville and Harrodsburg, Ky., on May 30, about 2,000 persons went over the road in excursion trains. At Harrodsburg a barbecue was enjoyed together with much speech making and music. Celebrations will be held at Shelbyville and Lawrenceburg soon.

Michigan Central.—The company has under construction 8½ miles of new road, including 4 miles of a belt line at Detroit. The grading is being done by the company's own men.

Milwaukee, Lake Shore & Western.—Another survey is being run for the proposed extension from Wausau southwest to Marshfield, on the Wisconsin Central. A preliminary survey was made last year.

Mineral Range.—Charles A. Wright, General Manager, has been appointed receiver, for the non-payment of the principal and annual interest on the first mortgage bonds, amounting to $200,000, which matured June 1. This default does not affect the Hancock & Calumet road, which is controlled by the above road. The Mineral Range road runs from Houghton to Calumet, Mich., 15½ miles, with a two-mile branch to Franklin. This is one of the roads which was under the H. S. Ives management.

Minneapolis & Pacific.—A survey is now being made from Nonango, Dak., southwest to Ashland, McIntosh County.

Minneapolis & St. Louis.—Default was made this week on the payment of the interest on $950,000 of first mortgage bonds of the Merriam Junction branch, $1,015,000 first mortgage seven per cent. bonds on the Iowa extension from Albert Lea to Fort Dodge, and $636,000 seven per cent. Southwestern extension bonds.

Mississippi & Mexican Gulf.—Organized to build a road from Natchez, Miss., to a point on the Gulf of Mexico near Mobile, Ala.

Missouri, Kansas & Texas.—The road has defaulted in interest payments on its bonds, and it has been decided to reorganize the company. It is understood that application for a receiver will be made within two weeks at Leavenworth, Kan.

Missouri, Tennessee & Georgia.—A preliminary survey is being made from Humboldt, Tenn., to a point on the Mississippi River, opposite New Madrid, Mo.

Nebraska & Western.—Incorporated in Nebraska to construct a road from Covington, Dakota County, opposite Sioux City, Ia., westerly through the counties of Dakota, Dixon, Cedar, Wayne, Pierce, Antelope, Holt, Wheeler, Garfield, Loup, Blain, Logan, Thomas, Grant, Sheridan, Box Butte, Dawes and Sioux to the state line. The capital stock is $9,000,000.

New Castle & Shenango Valley.—The rails and ties for completing the road are being delivered, and it is thought that it will be open for traffic about Aug. 15. The grading is now about half completed between New Castle and West Middlesex, Pa., on the New York, Pennsylvania & Ohio, which guarantees the $250,000 bonds of the company. Belden & McTighe, of New York, are the contractors.

New Haven & Derby.—On the extension from Birmingham to a connection with the Housatonic at Botsford, Conn., about four of the 13 miles have been graded ready for tracklaying.

New Roads.—Michigan capitalists, the owners of about 200,000 acres of land between Pine Bluff and Sheridan, Ark., propose to build a road from Pine Bluff to Malvern, and establish a large lumber depot at the former city if $35,000 is voted in aid of the enterprise.

New York & New England.—It is announced that, commencing June 6, a through Pullman sleeping-car train will be run between Bar Harbor, Baltimore and Washington, via the Maine Central to Portland, the Portland & Rochester to Rochester, N. H., the Boston & Maine to Worcester, the New York & New England to Hartford, the New York, New Haven & Hartford to the Harlem River, the transfer steamer Maryland to Jersey City and the Pennsylvania. The train will leave Bar Harbor at 7:20 a. m. and reach Philadelphia the following morning at 7 o'clock, Baltimore at 10 and Washington at 11. The north-bound train will leave Washington at 2 p. m., Baltimore at 3:10 and Philadelphia at 6:35, and be due at Bar Harbor at 6 p. m. the following afternoon.

New York, Pennsylvania & Ohio.—In connection with the double tracking of the Cleveland & Mahoning Valley, from Cleveland to Youngstown, O., the Cleveland shops will be transferred to Youngstown, and a 20-stall engine house built.

The construction of the 15-mile extension from New Lisbon to East Liverpool, O., will, it is stated, soon be commenced.

Northern Minnesota.—The survey for this road will probably be commenced this month. It is to be built from Emerson, Manitoba, near the International boundary, southeasterly about 95 miles to Red Lake Falls, Minn., on the Northern Pacific. Edward H. Low, Hallock, Minn., is Secretary.

Oakland, Alameda & Laundry Farm.—It is stated that the construction of this short California road will be commenced this or next week. The company has not yet succeeded in getting deeds for the right of way at Laundry Farm, but it is expected all differences will soon be settled. J. H. Woodward is President.

Ocean Air Line.—Incorporated in California to build a road from Los Angeles through Santa Monica, Port Ballona, Wilmington, to Long Beach. The capital stock is $350,000, of which over 15 per cent. has been subscribed. A preliminary survey will be made immediately.

Omaha, Dodge City & Southern.—A survey will be commenced this week for a line from Dodge City, Kan., to Superior, Neb. G. C. Gallagher, Dodge City, is Vice-President and Chief Engineer.

Paris, Choctaw & Little Rock.—A bill granting the company right of way across the Indian Territory has been reported upon favorably in Congress. President J. C. Wright is reported as saying that surveying will be commenced immediately at Paris, Texas.

Pennsylvania.—The grading has now been all completed on the Cambria & Clearfield road, which is being built from La Jose, on the Clearfield & Jefferson, westerly about 9 miles to reach coal mines.

Pennsylvania Company.—At the annual meeting in Pittsburgh, June 5, the lease of the Pittsburgh, Youngstown & Ashtabula, made Dec. 12, 1887, was unanimously confirmed.

Pensacola & Memphis.—The locating survey from Meridian, Miss., to Pensacola, Fla., about 183 miles, is now being made, and the contracts for construction will be let this month. W. W. Hungerford, Meridian, Miss., is General Manager.

Philadelphia & Reading.—The syndicate with whom the $24,680,000 four per cent. seventy year bonds of the company were placed, offered them for subscription this week at 87½ per cent., in New York, Philadelphia and London. Subscriptions aggregating several times the amount offered, were received.

Pine Bluff, Princeton & Arkadelphia.—Charter filed in Arkansas to construct a road from Pine Bluff southwesterly through the counties of Jefferson, Grant, Cleveland and Dallas to Princeton, and thence northwesterly to Arkadelphia, Clark County, an estimated distance of 70 miles. The capital stock is $650,000.

Port Arthur, Duluth & Western.—It is stated that President Thomas Marks has negotiated the sale of the company's bonds in England, which with the subsidy of $271,000 just granted the company by the Dominion Government, will insure the building of the road. Grant & Ross have a large contract, of which but 11 miles west from Port Arthur have been graded. Henry K. Wicksteed is Chief Engineer.

Port Jervis, Monticello & New York.—All the ties have been distributed for the extension that is being constructed from Huguenot to Summitville, N. Y., on the New York, Ontario & Western, a distance of 18 miles. About 16 miles of the grading has been completed. H. R. Low, Middletown, N. Y., is the contractor.

Portsmouth & South Mills.—The company has been organized at Portsmouth, Va., to build a road south from that city to South Mills, near Camden, N. C., a distance of about 30 miles, but it is intended to have the charter amended so that the road may be continued on to Goldsborough.

Powell's Valley.—The name of this road, which is being constructed from Knoxville, Tenn., through Cumberland Gap, has been changed to the Knoxville, Cumberland Gap & Louisville.

Richmond & Chesapeake.—Ground was broken June 4 on the construction of the tunnel at Eighth street, Richmond, Va. It is proposed to build the road from Richmond to a point near the mouth of the Potomac River, opposite Crisfield, Md.

Rio Grande & Utah.—It is stated that the contracts for constructing the road will be let during the summer. It has been surveyed from Algodones, New Mexico, on the main line of the Atchison, Topeka & Santa Fe, to Durango, Col., a distance of about 200 miles. John W. Conley, Chicago, Ill., is President. Stockholders of the Atchison, Topeka & Santa Fe are largely interested in the road.

Rochester & Glen Haven.—It is expected to have the road completed and in operation by July 3. It is being built from Rochester to Glen Haven, on Irondequoit Bay, N. Y., a distance of 3½ miles. E. W. Huntington is the contractor. At the bay terminus 15 acres of marsh land are being filled and a protecting breakwater is being constructed.

Rochester & Honeoye Falls.—The right of way has now been obtained and it is stated that work will be commenced very soon. The survey was made early last spring. A. Grant Childs is Chief Engineer.

St. Augustine & East Coast.—Grading has been completed for about six miles on this road, which it is proposed to build from St. Augustine south, following the coast and passing through the towns of Moultrie, Carterville, Ormond, Daton and New Smyrna, 85 miles. S. J. Fox, St. Augustine, Fla., is General Manager.

St. Johns, Lake Weir & Gulf.—It is stated that all arrangements have been made for commencing work on this road, which it is proposed to build from a point on Lake George in Putnam County, Fla., to a point on the Gulf of Mexico in Hillsborough County.

St. Louis, Sturgis & Battle Creek.—The contracts for building the road have been let to J. J. Burns, Battle Creek, Mich., and it is expected that it will be completed this year. The line has been surveyed from Battle Creek southwesterly to the Indiana state line to a connection with the Canada and St. Louis, which is projected through Indiana towards Danville, Ill. At Battle Creek the road will connect with the Battle Creek and Bay City, which is to be built north to Bay City. The contracts for the three roads have been let to J. J. Burns.

Sault Ste. Marie & Southwestern.—The surveys are being made for this road in Minnesota from a point opposite Alma, Wis., on the Mississippi River, over which it is proposed to build a bridge.

Shawnee & Muskingum Valley.—Grading is in progress at Corning, O., with a force of about 300 men. The approaches to the tunnel at Corning, O., are also nearing completion. P. R. McLaughlin, Columbus, O., is Superintendent.

Silver Springs, Ocala & Gulf.—Tracklaying has been commenced on the branch which is being built from Dunnelon, Fla., on the main line, southwesterly to Homosassa, a distance of about 23 miles. An extension of the main line is also being built from Dunnelon Junction to Bridgers, Fla., about 17 miles. The Florida & West Coast Improvement Co. are the contractors.

Slatington.—Incorporated in Pennsylvania to construct an extension of the Schuylkill & Lehigh from a point in Lehigh County, about 3 miles west of Franklin Station, to a point at or near Williamsport, in Northampton County, a distance of about eight miles. The capital stock is $200,000.

Toledo, Saginaw & Muskegon.—A line is being surveyed southeasterly from the present terminus at Ashley, about 45 miles to Flint, Mich. The connection at Flint, with the Chicago & Grand Trunk, will give a very direct line from Muskegon to Port Huron.

Tennessee Central.—An extension is being surveyed from the present terminus at Jewett, northwesterly about 14 miles to Crossville, Tenn., and it is expected that the contracts for grading will be let next month.

Tennessee Midland.—The road was formally opened May 31 by running an excursion train of six cars from Memphis to Jackson, Tenn., 86 miles, which was filled with a happy party, composed of the officers, stockholders and guests of the road, including a number of the South's most beautiful women. When Jackson was reached the party was escorted to the court house, where an address of welcome was delivered, which was responded to in a most happy vein by several officers of the road. "After the sumptuous repast in the court-house, with fair women to serve the refreshments, the visitors were driven about the city until three o'clock when they boarded the train for the return to Memphis." The road was opened for regular traffic June 1.

Unadilla Valley.—The subscriptions to the capital stock in Leonardsville now amount to $33,000. It is expected that $100,000 stock will be taken in Utica. The road is projected to extend from Bridgewater to New Berlin, N. Y., 20 miles.

Union (of Chattanooga).—The contract will probably be let this month for constructing about two miles of an extension of this local road from Orchard Knob to Arno, Tenn. R. H. Bowron, Chattanooga, is General Manager.

Versailles & Midway.—A force of about 200 graders is at work on the extension from Georgetown to Midway.

Wagner Palace Car Co.—The capital stock has been increased from 60,000 to 100,000 shares to represent new contracts and increased assets. The new shares are to be distributed to the stock holders.

Walden's Ridge.—The extension from the present terminus at Oliver Springs, northeasterly, 15 miles, to Clinton, Tenn., has been completed.

Warrior Coal Fields.—About 23½ miles of the road from Meridian, Miss., toward Gainesville, Ala., has been graded, and the locating survey from Gainesville to Decatur, Ala., 218 miles from Meridian, will be commenced immediately.

Washington Short Line.—Incorporated in Washington Territory to construct a road from the terminal of the Northern Pacific in Tacoma, about 5 miles, to Point Defiance. The road will connect important points in the city of Tacoma. The capital stock is $200,000.

Whitefield & Jefferson.—The stockholders, at the annual meeting in Plymouth, N. H., May 28, voted to increase the capital stock from $170,000 to $200,000, the proceeds to be used in building an extension toward Berlin Falls, N. H.

Winnipeg & Southwestern.—At a meeting of the directors in Winnipeg last week, the officers were instructed to make arrangements for the construction of the road to the southern boundary of Manitoba. It is thought that about 40 miles will be built this year.

Winona & Southwestern.—The surveys for the location of the first 20 miles from Winona, Minn., have now been nearly completed, and preliminary lines are being run to Mason City, Ia., about 130 miles from Winona. The date for letting contracts has not yet been decided upon. D. M. Wheeler, Winona, is Chief Engineer.

TRAFFIC AND EARNINGS.

Traffic Notes.

Lake rates from Chicago to Buffalo have fallen slightly, the last quotations being 2 cents per bushel on wheat and 1¾ on corn.

On May 30 the Kankakee line reduced its round trip passenger rates from Chicago to Indianapolis to $5 and to Louisville and Cincinnati $8, which is $3 less than the cut rates which were already in force.

The Illinois Central has announced a new distance tariff for local freight in Iowa, based on the 40 cent rate between Chicago and St. Paul.

The agreement among the Southwestern lines to bill live stock at actual weight is not yet consummated, and the weighing of cars has been suspended until further action shall be taken.

The Inter-state Commerce Commission will meet in the Post Office building, New York City, Monday, June 11, to give a hearing on the complaint of the New York Produce Exchange against the Trunk Lines.

Convention Rates.

Reduced rates for round trips to the Presidential convention at St. Louis and Chicago have been made the occasion of considerable strife among the roads west of the Missouri River. Nearly all the prominent lines of the country made a round trip of half fare, but it appears that the new roads in Kansas, which had made no agreement, reduced the rates still lower than this. The Chicago, Kansas & Nebraska, which is the western system of the Chicago, Rock Island & Pacific, led off by making a rate of 1 cent per mile. Subsequently the Chicago & Alton agent at Denver announced a round trip rate of $27.20 to St. Louis, which was $5 less than the special rate first announced. Other lines at once made a similar reduction, and the general passenger agents of the roads east of the Missouri River were obliged to agree upon a reduction in their territory in order to meet the competition. The round trip rate between Kansas City and Chicago, which was at first fixed at $12.75, was reduced to $9.75.

Northwestern Rates.

After various conflicting reports concerning the action of different roads, it appears that the new rates were put in force by all the lines between Chicago and St. Paul on June 4. All had agreed on a through tariff based on 60 cents first class, but within two days the Chicago, Burlington & Northern announced that it had reconsidered its action and would make its rates 40 cents from and after June 4. Upon this the Chicago, St. Paul & Kansas City announced that it would make its through rates 40 cents, but would maintain rates to non-competing points on the basis of 60 cents. Traffic Manager Hanley, of this road, sent the following letter to the Inter-state Commerce Commission:

To the Honorable Inter-state Commerce Commissioners, Washington, D. C.:

GENTLEMEN: Owing to the action of competing lines covering rates between Chicago, St. Paul and Minneapolis, this company has been obliged to promulgate since the 7th day of last February no less than nine different tariffs, and having regard to the principles of the Inter-state law this has required us nine times in 118 days to revise rates all over our line. No longer ago than May 22 last, at a meeting of all the roads interested in the traffic between Chicago, St. Paul and Minneapolis, a unanimous agreement was arrived at to put into effect on June 4 a tariff covering this traffic. Schedules were printed and the necessary 10 days' notice was given by all the companies. Before the 10 days expired we were notified by the Chicago, Burlington & Northern Co. that on the 4th day of June, 1888, instead of the tariff agreed upon it would put in effect between Chicago, St. Paul and Minneapolis a materially lower schedule of rates. This company is not prepared to surrender its business between these points, and at the same time it does not desire to disturb rates all over Minnesota, Iowa and the states west of the Missouri River for the tenth time in less than three months, which a readjustment of its rates over the whole line in accordance with the long and short haul clause of the Inter-state Commerce law and with state laws would bring about, and has therefore determined to assume the responsibility of meeting this competition between Chicago, St. Paul and Minneapolis, readjusting rates at intermediate points, and if complaint is made will attempt to justify its action under the law. We feel it our duty to at once notify you of our action, and inclose the tariff which we propose to put into effect June 4."

At last accounts all the roads, except the two above named, had the 60 cent tariff in force and were apparently waiting to see what would be the effect of Mr. Hanley's move. A Washington dispatch reports that Commissioner Cooley has signified his intention of taking up this question at once, without waiting for a complaint.

Vegetable and Fruit Traffic from the South.

A series of careful inquiries as to the extent and value of this trade, which has lately expanded to large proportions, by the *Manufacturer's Record* leads us to the conclusion that between Feb. 1 and Aug. 1 last year the shipments of garden "truck" and fruit from all southern points exceeds 300 000 car loads, which it values at $100 per car for a minimum, giving a total value of $30,000,000. And allowing only $15 per car load for freight charges the earnings of transportation lines from this business would be $4,500,000. The traffic this year appears from all accounts to be heavier than that of last season.

Rates to Montana.

The Union Pacific has issued a new freight tariff naming rates between Missouri River points and points in Montana. The old and new rates to and from Spring Hill, Red Rock, Dillon, Melrose, Silver Bow, Butte, Stuart, Anaconda, Warm Spring, Deer Lodge, Garrison, Avon, Mullan and Helena are as follows:

	1.	2.	3.	4.	5.	A.	B.	C.	D.	E.
Old	2.35	2	1.75	1.50	1 30	1 25	1	90	80	70
New	2.05	1.80	1.55	1.30	1 15	1.05	92	82	72	62

East-bound Shipments.

The through shipments of east-bound freight from Chicago by all lines for the week ending June 2 amounted to 34,114 tons, against 37,902 tons during the preceding week, a decrease of 3 788 tons, and against 28,683 tons during the corresponding week of 1887, an increase of 5,431 tons. The proportions carried by the different roads were as below:

	Week ending June 2 Per cent.	Preceding week. Per cent.
Wabash	8	9
Michigan Central	8	8
L. S. & M. S.	12	15
Pitts., F. W. & C.	13	14
Chi., St. L. & P.	11	11
Balt. & Ohio	6	6
Chic. & G. T.	22	18
N. Y. C. & St. L.	6	8
Chi. & Atlantic	14	11
Total	100	100

Of the above shipments 3,654 tons were flour, 7,376 tons grain, 3,810 tons cured meats, 1,196 tons lard, 8 940 tons dressed beef, 1,467 tons hides, 122 tons wool, and 5,050 tons lumber.

Railroad Earnings.

The statement of the earnings and expenses of the Canadian Pacific for April and the four months ending April 30 shows:

Month of April:	1888.	1887.		Increase.
Gross earnings	$1,034,586	$850,399	I.	$184,187
Oper. expenses	794,907	617,943	I.	166,964
Net earnings	$240,679	$232,456	I.	$17,223
Four months—Jan. 1 to April 30:				
Gross earnings	$2,642,309	$2,723,793	I.	$918,516
Oper. expenses	3,154,430	2,487,340	I.	667,090
Net earnings	$487,879	$236,453	I.	$251,426

The April statement of the Louisville, New Orleans & Texas is as follows:

	1888.	1887.		Increase.
Gross earnings	$159,773	$124,942	I.	$34,831
Oper. expenses	135,413	112,498	I.	22,915
Net earnings	$24,360	$12,443	I.	$11,917

The earnings of the Kentucky Central for April show:

	1888.	1887.		Decrease.
Gross earnings	$69 503	$77,399	D.	$7,896
Oper. expenses	46,143	47,696	D.	1,553
Surplus	$23,3 9	$29,702	D.	$6,343

The following is the Louisville & Nashville statement of earning and expenses for April:

	1888.	1887.		Inc. or Dec.
Gross earnings	$1,204,415	$1,177,743	I	$26 672
Oper. expenses	842 372	792,687	I.	49 685
Net earnings	$362,043	$385,056	D.	$.3,013

The statement of the earnings, expenses, and fixed charges of the Richmond & Danville system for the seven months ending May 1 is as follows:

Richmond & Danville:	1888.	1887.
Gross earnings	$3,045,047	$2,66 ,321
Expenses	1 5 9,481	1 342,155
	$1,525,566	$1, 21,166
Int, rentals, and taxes	939,198	913,734
Surplus	$586,368	$407,432
Virginia Midland:		
Gross earnings	$996 514	$899,855
Expenses	580,078	566,057
	$416,436	$333,798
Int., rentals, and taxes	399,684	401,636
Surplus	$16,753	Def. $67,838
Charlotte C. & Augusta:		
Gross earnings	$605 825	$523,097
Expenses	303,044	261,617
	$302,781	$261,480
Int., rentals, and taxes	165,971	165,989
Surplus	$.36,810	$95,.1
Columbia & Greenville:		
Gross earnings	$421,355	$388,436
Expenses	241,593	234,513
	$179,7 2	153,893
Int., rentals, and taxes	151,670	151,667
Surplus	$28,092	$2,226
Wn. North Carolina:		
Gross earnings	$372,760	$354,974
Expenses	315,3.6	293,528
	$57,424	$61,046
Int. and taxes	92 888	86 380
Deficit	$35,4 4	$25,334

The statment of the Chicago, Burlington & Quincy for April shows a decrease in net earnings of 83 per cent, for the first four months the decrease in net earnings was nearly 79½ per cent. The following is a comparison for April and the four months as compared with last year:

Month of April:	1888.	1887.		Inc or Dec.
Gross earnings	$1,703,814	$2 197,890	D.	$494 055
Oper. expenses	1,549,164	1,287,768	I.	261,396
Net earnings	$154,680	$910,131	D.	$755,451
Four months—Jan. 1 to April 30:				
Gross earnings	$6,272,347	$8,983,222	D.	$2 710,355
Oper. expenses	5,397,691	4,716 874	I.	680,817
Net earnings	$875,156	$4,266,328	D.	$3,391,172

The following is the Union Pacific report of earnings for April. The gross earnings were $2,539,242, an increase of $197,487. Operating expenses meantime decreased, and net earnings of $1,116,682 were left, an increase of $270,332 compared with April, 1887. For the first four months of 1888 the company's net earnings have increased $354,834.

Earnings of railroad lines for various periods are reported as follows:

Month of April:	1888.	1887.		Inc. or Dec.	P c.
Allegheny Valley	$163,519	$163,606	D.	$87	...
Net	72 6 0	6 ,3 3	I.	9,297	14.3
Cairo, V. & C.	54,5 2	50.0 2	I.	4,530	10 0
Net	12,030	1,664	I.	10 366	...
California South.	158,314	132 4 0	I.	25 894	19 0
Net	33,507	6 ,159	D.	28.652	45.1
Canadian Pac.	1,034,586	850 39	I.	184,187	21.1
Net	2 9,6 9	232,450	I.	17, 23	7.3
Carolina Central.	34,107	32 903	I.	1,204	3.1
Net	4 0 5	1 0.8	I.	2,987	203.0
Den. & R. G. W.	103 043	75,6 9	I.	27,424	36 0
Net	26,2 2	9 .59	I.	16 833	177 7
E. Tenn., V. & G.	416,674	362,766	I.	53 908	14 6
Net	140 873	51,439	I.	89 434	174.5
Kentucky Cent.	69 504	77, 00	D.	7,896	9.1
Net	23,360	29,703	D.	6,343	21.7
Louis. & Nashv.	1,204,4 5	1,177 74 1	I.	26,672	2.2
Net	35 ,013	385,056	D.	23,043	6.0
L. N. O. & Tex.	159,774	124,942	I.	34,832	27 4
Net	24,760	1 ,444	I.	11 9 6	91.7
Mem. & Charles.	120 367	117,293	I.	3 674	2.5
Net	19,132	18,244	I.	888	4.8
N. Y., L. E. & W.	2,11 ,6 6	2,048 997	I.	63 6 9	3.1
*Net	532 747	508 248	I.	24,499	4.7
N. Y., Ont. & W.	13 992	118 268	I.	1,.74	11 0
Net	12,483	15 435	D.	2 952	19 3
Northern Pac.	1,44 ,868	1,121,065	I.	323,863	28 8
Net	427 149	539,643	I.	87,806	16.1
Ohio & Miss.	27 079	300, 94	D.	30,215	10.0
Net	56,688	98 764	D.	4 .076	43.8
Phila. & Erie.	329,481	314,541	I.	14,960	4.4
Net	145 85	1 4,927	I.	2 ,058	16 1
Pitts. & Western.	153,168	175,139	D.	21 971	12.0
Net	39,797	40,305	D.	508	1.2
Rome, Wat & Og.	251 67	237 986	I.	13,5.1	5.5
Net	99,650	91 578	I.	6,072	6 4
Sea. & Roanoke.	57,8 8	49 698	I.	8,170	16.4
Net	22,943	20 609	I.	2,334	11.0
Total (gross)	$8 281,0 4	$7,541,071	I.	$740,0 3	9.8
Total (net)	2,504,663	2,368,524	I.	136,139	8.5

Four months—Jan. 1 to April 30:					
Allegheny Val Co.	$634,854	$618 856	I.	$15,998	2 4
Net	26 ,935	218 247	I.	43,688	19.7
California South.	630,9 3	5 6,541	I.	114,372	22.1
Net	181,773	254 094	D.	72, 21	28.3
Canadian Pac.	3,642 3 8	2,723, 93	I.	918,515	33.7
Net	487,878	236,453	I.	251 425	106.3
Carolina Central.	184 38	173,554	I.	10,584	5.8
Net	60,0 7	56,743	I.	3 334	5 0
Den. & R. G. W.	387 455	30 ,441	I.	85,014	28.1
Net	7 ,980	65 613	I.	10,367	15 4
E. Tenn., V. & G.	1,703,.99	1,5 9 918	I.	197,381	12.4
Net	594,193	4 3,461	I.	100.662	37.0
Kentucky Cent.	289 891	285,0 50	I.	3 841	1 1
Net	94 181	98,496	D.	4,315	4.0
Louisv. & Nashv.	5,052,829	4,903 047	I.	149,782	3 1
Net	1,571,808	1,793,420	D.	221,612	12 3
L. N. O. & Tex.	8 9,419	690,087	I.	1 9,332	17 2
Net	212,505	194,014	I.	18,491	9.1
Mem. & Char.	548,141	526 731	I.	21,410	3.9
Net	86 463	13 ,573	D.	45,1 0	34.4
N. Y., L. E. & W.	8,181 538	7 98 ,027	I.	199,511	2 5
*Net	1,974 643	1,908,469	I.	66 174	3 4
Northern Pacific.	4 91,736	3,248,873	I.	1,042 903	32.1
Net	1 230,436	1 022 404	I.	208,0 2	20 3
Ohio & Miss.	1.158 504	1,2 7 238	D.	138,734	10 7
Net	282,193	425,468	D.	143 275	33 6
Phila. & Erie.	1,102, 23	1,158,380	D.	56 057	4 8
Net	403 458	484,27 2	D.	80,814	16 5
Phila. & Read.	5,449,2 5	6,600,5 5	D.	1,151,280	17.4
Net	1 ,5,9 6	3,2 2, 07	D.	1,306,391	39 7
P. & R. C. & I. Co	2,9 2 9 9	4,643,9 8	D.	1,741,019	37 2
Net	Def. 180 415	105,721	I.	74 694	70 5
Total both co's.	8,362,135	11,244, 33	D.	2,88 , 98	25 6
Net	1 805,591	3,298,026	D.	1,.92,5 5	46.8
Pitts. & West	55 ,804	62 ,9 9	D.	67,125	10 7
Net	142 402	133 850	I.	8,552	6 0
Rome, Wat. & Og.	9 9,673	878,323	I.	61,350	6.9
Net	347,559	331,196	I.	16 363	4 9
Sea. & Roanoke.	228,9 3	192,456	I.	35,757	18.2
Net	81,976	63,864	I.	20,113	31 7
Total (gross)	$38,9 1,173	$38 941,637	D.	$168,464	0.4
Total (net)	9,896,831	11,249,663	D.	$1,352,832	12.0

* Less due leased lines.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Coal.

The coal tonnages for the week ending June 2 are reported as follows:

	1888.	1887.	Inc. or Dec.	P. c.
Anthracite	268 511	272,977	D. 4.466	1 5
Bituminous	3 4,277	292,641	I. 28,636	9.6

The Cumberland coal trade for the week ending June 2 amounted to 69,978 tons, and for the year to that date, 1,441,163 tons.

Earnings of South Carolina Roads.

The Railroad Commissioners of South Carolina have published the following compilation of the earnings of the roads in the state for the month of April, with comparison with the same period last year: Twenty-four roads show an increase and two a decrease. The total earnings were $513,440 against $453,321 in April, 1887, showing a net increase of $40,059. The aggregate decrease in the earnings of the two roads was only $455. The total freight earnings for the month were $274,286, and the passenger earnings $188,851, against $251,005 and $153,836 respectively in April, 1887. The Richmond & Danville system shows a net increase in earnings of 12.9o per cent.

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